REVIEW OF THE DEPARTMENT OF DEFENSE OVERSEAS COST-OF-LIVING ALLOWANCE

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*The views expressed in this paper represent those of the authors
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EXECUTIVE SUMMARY

The overseas cost of living allowance, or OCONUS COLA, is a bi-weekly payment provided to approximately 280,000 members of the Uniformed Services stationed at one of 600 locations outside of the continental United States. Its purpose is to compensate members for differences in the cost of living between the continental United States (CONUS) and the their assigned location outside of the continental United States (OCONUS). It does this by providing an allowance that represents the difference in the cost of purchasing a typical market basket of goods and services at the overseas location compared to the cost of purchasing that same market basket in CONUS. The cost-of-living index, which measures the cost of living at the OCONUS location relative to the CONUS cost, is the same for all members at the location. The COLA itself, however, varies across members because "spendable income"—the amount of the member's pay that is subject to adjustment—varies across members by pay grade and number of dependents. The current cost of the program is almost $1 billion annually. At locations where the COLA is paid, the average amount is $297 per month. The COLA, though, varies substantially by location.[1]

The Per Diem, Travel and Transportation Allowance Committee (PDTATAC), the organization responsible for calculating and adjusting the OCONUS COLA, requested a review of the current system. This paper summarizes the review, which extends from the conceptual or theoretical premises of the current system to technical improvements in the methods of implementing the system.

Under the current system, a "market basket' approach is used to determine the OCONUS COLA. The cost of a market basket of goods and services is estimated at CONUS prices and at the prices at the OCONUS locations. The COLA is based on the percentage difference in the cost of the market basket, applied to the member's "spendable" income—the amount of the member's income that is protected under the OCONUS COLA program.

Our major finding is that, conceptually, the CONUS market basket approach to determining the cost of living adjustment is sound, and is

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[1] For example, an E-6 with 10 years of service and 3 dependents would receive a COLA of approximately $36 per month in La Paz, Bolivia, and approximately $1,758 per month in Kure, Japan.

similar to the approach used by many private sector multi-national firms and international organizations. The system can be improved in a number of dimensions, however. Our major findings regarding the current system, and recommendations for improvement, are the following:

THE COST OF LIVING INDEX _____

Finding: The CONUS market basket is applied in most instances, but adjustments are made in the market basket in some locations to account for location-specific environmental factors. This makes the actual index used a hybrid between a Laspeyres (CONUS market basket) and a Paasche (local market basket).

> *Recommendation*: The "hybrid" approach tends to improve the welfare of the member, and should be retained.

Finding: The actual OCONUS COLA index value depends significantly on the proportion of shopping that the member does in the commissary and exchange. This proportion is currently based on actual expenditures, and often has perverse implications.

> *Recommendation*: We recommend commissary and exchange expenditure share estimates that are based either on CONUS patterns or on an explicit policy, rather than actual expenditures.

Finding: The exchange rate adjustment system, under which COLA adjustments are made only after exchange rates exceed a threshold (cumulative) percentage change, can lead to over or under payment of members who rotate into and out of assignments. The percentage change threshold was recently reduced from 10% to 5%, increasing the frequency of COLA adjustments for exchange rates and reducing the potential for a member to have been significantly under compensated due to the timing of the member's departure.

> *Recommendation*: The new exchange rate threshold of 5% is a reasonable compromise between frequency of exchange rate adjustment and the potential cost to the member. However, we recommend that PDTATAC continue to explore the advantages of continuous (bi-weekly) adjustments for exchange rate changes. Given advances in computer technology, it is unlikely that the costs of continual adjustment will outweigh the benefits.

Finding: Currently, there is a "miscellaneous" category of member expenditure, constituting about 10% of the market basket, for which it is

assumed that prices at the OCONUS location are the same as the prices in CONUS. This biases the index towards no change.

Recommendation: We recommend that actual prices be collected for the Miscellaneous category. In the interim, we recommend that prices in the Miscellaneous category at OCONUS locations be presumed to bear the same relationship to CONUS prices in that category as the expenditure-weighted average of the prices across the categories that are collected for that location bear. PDTATAC should study the implications of formally pricing the Miscellaneous category prior to a final decision to implement the recommendation.

MARKET BASKET ITEMS

Finding: Most private sector firms provide expatriates with an annual trip home from their assignment. A trip home is not included in the OCONUS COLA market basket.

Recommendation: We recommend that members and dependents be funded for one trip to the United States for each three-year OCONUS tour. Providing a trip home would, however, require legislative changes and may not necessarily be part of the COLA.

Finding: Long distance telephone service is not included in the current market basket.

Recommendation: We recommend that the cost of 30 minutes of long distance service per month be included in the OCONUS COLA.

Finding: The potential income loss for spouses during an accompanied overseas assignment could be substantial. Currently, there are no DoD programs, including OCONUS COLA, that adequately compensate for the potential loss of spouse income. Private sector firms typically do not attempt to compensate fully for lost spouse income. Instead, they provide "adjustment assistance' equal to about one-three months of the spouse's expected pay.

Recommendation: The Uniformed Services should attempt to limit potential spouse losses through a more flexible, voluntary assignment program. In addition, the Services should consider making spouses eligible for the unused portion of the member's Tuition Assistance (TAP) benefit while the member is on an accompanied OCONUS tour, or consider "spouse transition

assistance" in the form of one or two months of the member's basic pay. This would be analogous to a practice frequently found frequently in the private sector. We suggest, however, that the payment be a function of the member's basic pay, to make administration tractable.

DATA COLLECTION _____

Finding: The Uniformed Services collect OCONUS price data themselves, in cooperation with the Department of State. Actual budget costs are modest, because much of the data collection is done as collateral duty by members or civilian employees, or obtained through reciprocal arrangements with the Department of State. However, the "opportunity costs" of data collection may be significant. Most private sector firms obtain cost-living data by contracting with specialized firms. These specialized firms currently obtain data in approximately 69% of the locations required by the Uniformed Services, but only 50% of the locations where the Uniform Services currently collect price data.

> *Recommendation*: We do not recommend that the Uniformed Services outsource OCONUS data collection at this time. However, we recommend that they continue to explore the issue.

Finding: A major source of CONUS prices used in estimating the CONUS cost-of-living, for comparison with OCONUS, is data reported by the Commissary and Exchanges regarding prices in the U.S. private sector economy.

> *Recommendation*: Because CONUS prices affect all OCONUS COLA payments, we recommend that the PDTATAC regularly validate these prices through independent sampling, independent external indices, and other forms of quality assurance.

Finding: OCONUS price data are gathered annually, or more frequently at command request.

> *Recommendation*: We recommend that the Uniformed Services explore the possibility of using local price indices and information to update the OCONUS COLA on an interim basis— especially in countries with historically high rates of inflation.

Finding: A living pattern survey (LPS) is conducted at each location about every three years to determine the proportion shopping members and families spend in the local economy, on the installation, and through

catalogs, and to determine which stores in the local economy are frequented by members and families. This LPS is then used to estimate the proportion of shopping done at a government facility versus in the local economy. These "expenditure shares" are used in developing the COLA index. The LPS itself is controversial and the Commands typically consider it an imposition.

> *Recommendation*: If the recommendation is accepted to set government facility/local economy expenditure shares by policy, we recommend that the frequency for the administration of the LPS be scaled back. The actual survey results may be used only as one piece of information to be considered in setting on/off installation expenditure shares.

Finding: Sample sizes for the LPS are small and the method of sample selection is unscientific.

> *Recommendation*: PDTATAC should produce scientifically based sample selection and administration guidelines for the locations, and should select sample sizes that meet requirements for desired precision of estimates.

Finding: There is seasonality in prices that may bias the OCONUS COLA price indices, or result in high error rates.

> *Recommendation*: PDTATAC should begin to develop methods that would ensure prices are not biased or suffer from error rates due to seasonality. (We have suggested several approaches.)

SPENDABLE INCOME_____

Finding: The spendable income table is an important determinant of the member's COLA, because it indicates the amount of income that is subject to COLA protection. It has not been updated since 1989. A new table, using data from 1997-1998, is scheduled for introduction in FY 2001. Because the proportion of real income protected declines as real income grows, and because the member's nominal income has grown substantially over this period due to inflation, the member's COLA has been significantly below what it otherwise would have been if the table were updated more frequently.

> *Recommendation*: We recommend that the table be updated more frequently and that it be indexed for inflation in years in which it is not updated.

Finding: The current method of estimating the spendable income tables, using very aggregate data and few covariates, is inefficient and possibly biased.

> *Recommendation*: We recommend an alternative method, using data at the individual household level and an expanded set of covariates.

LOCATION-UNIQUE EXPENDITURES _____

Finding: The current method of determining whether a particular item should be included in a location's COLA payment as a location-unique expenditure could be more systematic.

> *Recommendation*: We recommend a set of criteria or principles for determining location-unique items.

Finding: The Uniformed Services do not have "hardship" pay for locations with especially onerous living conditions. The State Department, international organizations (e.g., the World Bank and the United Nations), and many international companies have hardship pay.

> *Recommendation*: We recommend that the Uniformed Services continue to explore this issue as a means to improve staffing at hard-to-staff locations.

Finding: Members in Alaska are required to carry safety kits in their cars. Members also incur large expenses to winterize their cars, some of which are not currently covered. These two items are not addressed adequately through the market basket for that location.

> *Recommendation*: We recommend that car safety and winterization costs be expanded under the COLA as location-unique items.

Finding: Members at a number of locations incur large "pet quarantine" expenses to bring their pet into the OCONUS location.

> *Recommendation*: We recommend that pet quarantine be considered for coverage under the Permanent Change of Station (PCS) move program, not the OCONUS COLA.

COLA SAFETY NET _____

Finding: An OCONUS COLA payment may decline for one or more of three reasons. First, prices in the local economy may decline. Second, prices in CONUS may grow at a faster rate than prices in the local economy. Third, exchange rate movements may cause the dollar to appreciate relative to the local currency. In the first case, the member's cost of living will have declined, both relative to CONUS and in the local economy. The only argument for not permitting the COLA payment to decline is that the member may have entered into fixed price contracts in the local currency. Given the nature of COLA expenditures, this will not typically be a major concern. In the second case, the member's cost of living has declined relative to CONUS, but it has not declined relative to the local economy. Here, a case can be made that a reduction in the COLA payment will make the member worse off. This is so even though such a reduction is consistent with a system that compensates members for the cost of living difference between CONUS and the OCONUS location. In the third instance, in principle the dollar will have appreciated, decreasing the cost of living in the local currency. A reduction in the dollar amount of the COLA is consistent with maintaining the same cost of living relative to both CONUS and relative to the local economy.

> *Recommendation*: We recommend that a COLA "safety net" be established that keeps the COLA payment from declining for members on their current tour when the COLA payment would otherwise decline due to an increase in CONUS prices. Because the current pay system may not be able to track the timing of tours, the safety net should apply to all at the location on an interim basis.

Finding: During periods of very rapid exchange rate changes such that the dollar is appreciating rapidly relative to the local currency, the dollar-denominated COLA payment is declining rapidly. However, it may be the case that large changes in exchange rates may be accompanied by significant changes in local prices, perhaps in a way that offsets all or part of the cost of living decline implied by the appreciation of the dollar. Because local prices are sampled only annually, the member may be significantly worse off in the interim.

> *Recommendation*: We recommend that when the dollar appreciates by more than 30% since the last scheduled local price survey, a moratorium should be placed on further reductions in the dollar-denominated COLA payments. This "safety net" will prohibit further declines until the scheduled annual price survey

validates the decline in the cost of living. In the interim, the command may request and conduct a price survey. If the survey reveals that local prices have increased, so that even the implied decline in COLA is incorrect, the COLA payment will be restored to the level implied by the price survey. If the survey reveals that the cost of living relative to CONUS has declined by more than that implied by the exchange rate changes, further declines in the COLA payments would not be implemented until the time of the scheduled annual price survey.

OCONUS COLA AND A VOLUNTARY ASSIGNMENT SYSTEM _____

Finding: There are a number of costs to members associated with OCONUS assignments for which OCONUS COLA, or other forms of allowances and reimbursements, could not fully compensate the member and the member's family under today's assignment system. These include: lost spouse employment income; discontinuity in dependent's schooling at critical periods; and strong aversion to particular types of climates, cultural settings, and other member-specific factors.

Recommendation: We recommend that the Services attempt to move more strongly in the direction of a purely voluntary assignment system. A key element to such a system is a solid OCONUS COLA. In addition, it should be supplemented, to the extent that budget realities permit, with a system of special pay incentives for difficult to fill OCONUS assignments. These special pay incentives will be set by supply and demand conditions for OCONUS positions. Potential advantages of moving toward such a system include: (1) a better match of the preferences of qualified members with assignments; (2) higher retention rates; (3) reduced turnover and greater productivity within an assignment; and (4) explicit budget costs of filling certain positions that more fully reflect the true economic cost of those positions.[2]

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[2] The importance of the last point is that, if there are certain assignments or billets that are extremely costly to fill, the Services, by recognizing the true cost of those positions by filling them through voluntary assignments, will become more innovative in developing ways to accomplishing missions without such costly positions.

ADMINISTRATIVE ISSUES _____

Finding: There are a number of items included on COLA payments for which the member must make a single "lump sum" payment, annually or per tour. However, the nature of the current allowance is that it is a per diem, or per day, payment. Hence, the cost of these items are reduced to an implied daily rate, and included in the bi-weekly COLA payment as if the expenses were incurred continuously over the year. If these lump sum payments come early in the member's tour, financing them can pose a hardship, especially for junior enlisted. However, changes to allow lump sum payments would require legislation.

> *Recommendation*: PDTATAC should consider recommending that legislation be prepared that would permit lump sum COLA payments for certain items. Special consideration should be given to items that are legally required or mandated and for which a lump sum payment is required by the member early in the member's tour.

Finding: The commands, and other legitimate forums, frequently raise issues for consideration regarding member's expenses that are not covered under the OCONUS COLA, or other programs. The PDTATAC often serves as the de facto organization for consideration of these issues. Often, however, the expense at issue is more appropriately addressed under another program, such as the Department of Defense Dependent Schools (DoDDS). However, there is no organization which has the formal responsibility for ensuring that the issues are addressed by the appropriate program.

> *Recommendation*: We recommend that a committee be formed to ensure that the issues are formally addressed by the appropriate program. We recommend that the primary members of the committee should be the Compensation Directors for the Office of the Secretary of Defense and the Uniformed Services, and the chairman of the Per Diem committee. The Director of Compensation Policy for the office of the Secretary of Defense (FM&P) should chair the committee.

1. INTRODUCTION AND PURPOSE

The overseas cost of living allowance, or OCONUS COLA, is a bi-weekly payment provided to approximately 280,000 members of the Uniformed Services stationed at one of 600 locations outside of the continental United States.[3] Its purpose is to compensate members for differences in the cost of living between the continental United States (CONUS) and the their assigned location outside of the continental United States (OCONUS). It does this by providing an allowance that represents the difference in the cost of purchasing a typical market basket of goods and services at the overseas location compared to the cost of purchasing that same market basket in CONUS. The cost-of-living index, which measures the cost of living at the OCONUS location relative to the CONUS cost, is the same for all members at the location. The COLA itself, however, varies across members because "spendable income"—the amount of the member's pay that is subject to adjustment—varies across members by pay grade and number of dependents. The current cost of the program is almost $1 billion annually. At locations where the COLA is paid, the average amount is $297 per month. The COLA, though, varies substantially by location.[4]

The overseas COLA attempts to compensate the member for differences in the cost of living between CONUS and the overseas location. It does this by providing an allowance that represents the difference in the cost of purchasing a typical market basket of goods and services at the overseas location compared to the cost of purchasing that same market basket in CONUS. The percentage difference in the cost of the national market basket is the same for all members at the location. The COLA itself, however, varies across members because "spendable income"—the amount of the members' pay that is subject to adjustment—varies across members by pay grade and number of dependents.

The Per Diem, Travel and Transportation Allowance Committee (PDTATAC), the organization responsible for calculating and adjusting

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[3] We will refer to these as "overseas" locations, though in some instances they are clearly not overseas. DoD does not calculate a separate cost-of-living index for all 600 locations. In many instances, multiple locations in a geographic region will use the same cost-of-living index. DoD calculates cost-of-living indices for approximately 275 locations.

[4] For example, an E-6 with 10 years of service and 3 dependents would receive a COLA of approximately $36 per month in La Paz, Bolivia, and approximately $1,758 per month in Kure, Japan.

the overseas COLA, requested a review of the current system. The purpose of this paper is to summarize this review.

This review extends from the conceptual or theoretical premises of the current system to technical improvements in the methods of implementing the system. We summarize the major areas of review in the form of the following set of questions:

1. What can be learned from private sector firms and other organizations that may help to improve the overseas COLA?

2. Can the current system be improved? What are the likely effects of the current system on staffing? Are there changes that can improve the well-being of the member and family and, perhaps, improve staffing? Are there technical improvements that can be made in the logic, data, data collection, and calculation of the COLA that can improve accuracy and/or lower the cost of administering the system?

3. Are there alternatives to the current system that may be preferable to it? Are there ways to complement the system with other programs that can make the staffing of overseas assignments more efficient and/or improve the welfare of the member assigned?

The report is organized as follows. *Section 2* of this report presents a review of the current overseas COLA. The theory underlying the current system is reviewed first, then the mechanics. In *Section 3*, practices in the private sector and in other organizations are considered. This is followed by a section that analyzes the shortcomings of the current system and suggests alternatives for improvement (*Section 4*). It draws from the foundation provided by the review of the current system and review of private sector and other organizational practices. *Section 5* discusses the effect that the OCONUS COLA has on recruiting and retention. *Section 6* presents the case for moving towards a more voluntary assignment system, and how a solid COLA complements a voluntary assignment system. *Section 7* discusses two potential administrative changes to the COLA system. Finally, *Section 8* summarizes the findings and recommendations in tabular format.

2. DESCRIPTION OF THE CURRENT SYSTEM

The purpose of the overseas COLA is to reduce or eliminate the financial disadvantage of an overseas assignment due to differences in the cost of living between the assignment location and the continental United States. Thus, the overseas COLA is designed to help OCONUS members "maintain a CONUS purchasing power level." In this section, we examine the concept of the current system and describe the methods and data used to calculate and update the COLA. We critique some aspects of the current concept and methods in this section, but describe these issues in more detail in **Section 4**.

2.1 CONCEPT _____

2.1.1 An "Optimal" COLA

An ideal OCONUS cost of living adjustment would hold the member harmless for differences in prices between the overseas location and the continental United States. Ideally, one would want to construct a cost of living allowance that made the member and his or her family indifferent between the overseas assignment and an assignment in the (continental) United States, at least if the only differences were differences in the cost of living.

One way of representing this ideal, for the individual, is through an analytical device economists call the "indirect" utility function.[5] This is a functional relationship between a notional measure of a member's well-being or "utility" and the member's income and prices he or she faces at the location. For an assignment in the United States, we write for the individual:

$$U_i = U_i(p_c, I\,)$$

where p_c is a vector of prices in the United States for all goods and services, and I is the member's income. The function, $U(....)$ takes into account the member's tastes or preferences and translates prices and income into a (notional) measure of the members welfare. Note that the member's well-being or utility increases with increases in income, other

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[5] See, for example, Hal R. Varian, *Microeconomic Analysis*, Third Edition, W. W. Norton & Company, Inc. 1992, p.102

things being equal, and decreases with increases in the prices that he or she must pay for goods and services.

Now, if the individual is assigned overseas, he or she will face a price vector p_{oc}, so that the member's utility is:

$$U_i^{'} = U_i(p_{oc}, I).$$

If prices overseas are generally higher than those in the United States, holding all other factors constant, the member's welfare or utility is lower:

$$U_i(p_{oc}, I) < U_i(p_{oc}, I).$$

We define the "optimal" cost of living allowance, ΔI, as that increase in income that just compensates for the higher overseas prices and restores indifference. That is, the optimal COLA is ΔI such that the member's welfare or utility is again the same regardless of the overseas or U.S. assignment:

$$U_i(p_{oc}, I + \Delta I) = U_i(p_{oc}, I).$$

This is, in principle, the "ideal" cost of living adjustment—one that makes the individual indifferent between the overseas location and the domestic location. In this form, if there are no other differences between the overseas location and the domestic location except prices, the COLA (or increase in income) required to compensate for the differences in prices will generally be *less* than the difference in cost of consuming the same set of goods and services consumed domestically at overseas prices. This is because the member will substitute, at the margin, goods and services that are relatively less expensive overseas for goods and services that are relatively more expensive overseas, compared to domestic prices for those goods and services.[6]

However, it is also true that the overseas and U.S. assignment will differ by *more* than simply the differences in prices between the two locations. Let E be a vector of environmental factors, such as climate, scenery, cultural opportunities, and other non-priced amenities that are not

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[6] Consider a simple, if trivial, example. Let us suppose that, in the U.S., the member consumes 2 loaves of rye bread per week, at a price of $1.00 per loaf. On being assigned to Naples, the member finds that rye bread is available only at the U.S. equivalent price of $1.50 per loaf. The increase in the cost of living, holding the quantities consumed at the domestic level of 2 loaves per week, is $1.00 per week. However, the member finds that Italian bread in Naples is offered at the U.S. equivalent price of $1.10 per loaf, and the member is (almost) indifferent between consuming rye bread and Italian bread. Hence, the member's actual cost of living has increased by only $0.20, not $1.00, per week, and the member would be indifferent with a COLA, i.e., ΔI, of only $0.20 per week.

captured by the price vector. Members will value these environmental factors or amenities according to their tastes. Some members may have a preference for cold, remote climates where there is hunting and fishing; others may prefer moderate climates; members with spouses from other countries may prefer an assignment in that overseas location; and so forth. We incorporate these environment factors into the member's welfare or utility function as:

$$U_i = U(p_c, E_c, I)$$

for the United States. For the overseas location, we similarly have:

$$U_i = U(p_{oc}, E_{oc}, I).$$

Now, assume we hold non-priced environmental differences constant. Define ΔI_{COLA} to be that income differential which exactly compensates the member for cost of living differences, holding environmental differences and other non-priced amenities constant (i.e., the E vector is the same in both CONUS and OCONUS). It is that value for which the following holds:

$$U_i(p_{oc}, E_c, I + \Delta I_{COLA}) = U_i(p_c, E_c, I).$$

Next, let the E vary between the continental United States and the overseas location, so that:

$$U_i(p_{oc}, E_{oc}, I + \Delta I_{COLA}) <=> U(p_c, E_c, I).$$

That is, we recognize that the non-priced amenities at the overseas location could be preferred to the amenities in the United States, or vice versa, or the member could be indifferent. Let $\Delta I_{amenities}$ be the dollar change in income that again makes the individual indifferent between the overseas location and the location in the United States (after making the [notional] adjustment for cost-of-living differences while holding environmental factors constant between the two locations), such that:

$$U_i(p_{oc}, E_{oc}, I + \Delta I_{COLA} + \Delta I_{amenities}) = U_i(p_c, E_c, I).$$

Note that $\Delta I_{amenities}$ may be positive or negative, depending upon how the overseas location amenities are valued relative to those in the United States. In general, we would anticipate that it is positive for most locations. That is, other things being equal, most members prefer the environmental conditions and other non-priced amenities of the United States compared to those of the typical overseas location. If true, this suggests that even if we were able to offer an "optimal" COLA, such as

ΔI_{COLA}, most members would probably prefer an assignment in the United States.

Based on this analysis, the total adjustment necessary to hold a member harmless in an overseas assignment is:

$$\text{Total adjustment} = \Delta I_{COLA} + \Delta I_{amenities}.$$

In the remainder of this section we focus our discussion on the concept and technical aspects of the cost-of-living adjustment, ΔI_{COLA}. In later sections we discuss in more detail the concept of a "hardship" allowance, $\Delta I_{amenities}$, and programs to complement the overseas COLA program to adjust for differences between CONUS and OCONUS in terms of environmental differences and other non-priced amenities.[7]

2.1.2 Laspeyres Price Index

The purpose of the overseas COLA is to compensate members for the difference in the cost of living between the continental United States and the OCONUS location. The precise notional measure, ΔI_{COLA}, cannot, of course, be achieved in practice. It would require knowledge of the member's utility or welfare function, U(.....), which is not observable, and which differs for each member.

A practical alternative is to compensate the member for the difference in cost of goods and services in the OCONUS location relative to the CONUS cost by computing a specific index of the differences. The current overseas COLA is a modified version of a Laspeyres Price Index. A Laspeyres index is calculated by selecting a basket of goods and services (i.e., the "market basket") relevant to one time period or location, and then determining the cost to purchase the identical market basket in a different time period or location. In the case of overseas COLA, the market basket is determined by expenditure patterns in the continental United States. The index is formed by determining the cost of purchasing the U.S. market basket at the overseas location relative to the cost of purchasing it in the United States.

To illustrate, let us assume that the CONUS market basket consists of two goods, purchased in the United States in quantities $Q_{1,C}$ and $Q_{2,C}$,

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[7] As discussed in Section 3, private sector firms often pay their employees assigned overseas allowances and premiums that represent, respectively, ΔI_{COLA} and

$\Delta I_{amenities}$. Likewise, the State Department and the World Bank pay hardship premiums to employees assigned to locations with more onerous living conditions.

respectively, at prices $P_{1,C}$ and $P_{1,C}$. Similarly, let prices at the OCONUS location for those same goods and services be $P_{1,OC}$ and $P_{2,OC}$, respectively. Then, the overseas COLA index[8] in this stylized example would be:

$$Index = \frac{P_{1,oc}Q_{1,C} + P_{2,oc}Q_{2,C}}{P_{1,C}Q_{1,C} + P_{2,C}Q_{2,C}}.$$

The salient point is that the quantities of the two goods that are priced at CONUS and OCONUS prices are the CONUS quantities. Now, let the member's income in CONUS be $P_{1,C}Q_{1C} + P_{2,C}Q_{2,C} = Income$. Then, if the index value calculated is, for example, 1.1, the member would receive a COLA equal to 0.1*$Income$. In general, this makes the member at the overseas assignment somewhat better off than the notional "optimal" COLA , ΔI_{COLA} , that precisely holds the member harmless, in terms of prices differences, between the OCONUS location and the United States. The reason is that the member in the overseas location will substitute among goods and services, consuming more of those items that are lower in price relative to CONUS, and vice versa. Hence, a COLA that compensates the member for the differences in cost between a fixed market basket that is based on CONUS expenditure patterns, and the cost of that same market basket at the OCONUS location will, other things being equal, make the member better off.

The Laspeyres index that is actually used is in terms of expenditure proportions, rather than quantities of good and services. They are, in fact, equivalent. Rewrite the index as:

$$\frac{P_{1,oc}Q_{1,C} + P_{2,oc}Q_{2,C}}{Income} = \frac{P_{1,oc}(P_{1,C}Q_{1,C})}{P_{1,C}Income} + \frac{P_{2,oc}(P_{2,o}Q_{2,C})}{P_{1,C}Income} = \frac{P_{1,oc}}{P_{1,C}}w_1 + \frac{P_{2,oc}}{P_{2,C}}w_2,$$

where w_1 and w_2 are expenditure share weights.

This is the general form of the actual index. Note that the expenditure weights must be the current CONUS expenditures on the respective goods and services that are consistent with the current CONUS prices. If the expenditure weights are from an earlier period, and are not those associated with the current level of CONUS prices, this is not a valid Laspeyres index. In particular, if the expenditure weights lag behind the prices, the index will overstate price increases in CONUS and therefore

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8 In the absence of commissary/exchange purchases, which are described later.

understate the overseas COLA.[9] Hence, it is important to keep expenditure weights as up-to-date as possible in the calculation of the index.

The overseas COLA is not a true Laspeyres index, however, because the market basket is not completely fixed across locations. Although the market basket is based on the consumption patterns of military members who reside in CONUS, significant differences in climate and living conditions in some OCONUS locations (relative to CONUS) have led DoD to modify the structure of the market basket for some OCONUS locations. That is, the basket is modified at some locations to more closely reflect expenditure patterns of members at those locations.

Mathematically, the cost-of-living index used by DoD is described by the equation:

$$Index = \sum_G w_G \sum_g \frac{P_{g,OC}}{P_{g,C}} \times w_g ,$$

where $P_{g,oc}$ and $P_{g,c}$, are the OCONUS and CONUS prices, respectively for item "g". Also W_g is the expenditure weight of item "g" within Category "G" and W_g is the expenditure weight of category "G."

Within a category, item weights sum to 1 (i.e., $\sum_g w_g =1$). Across categories, the category weights sum to 1 (i.e., $\sum_G w_G =1$). Under the current system, the category weights can vary across locations.

2.1.3 Other Concepts

The index reflects variation across OCONUS locations in the cost of the basket. To determine the additional income required to maintain parity in purchasing power between CONUS and OCONUS locations, one must determine the portion of household income spent on purchasing the goods and services in the market basket. To do this, DoD uses a "spendable income" table that estimates the amount of money that a household spends on the goods and services in the market basket. Estimated spendable

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[9] The reason for this is the same reason that the Laspeyres index generally will overstate cost-of-living increases. In CONUS, members will reduce purchases of items that have risen relatively more in price, and increase purchases of items whose prices have risen relatively less. Hence, expenditure weights will change with price changes and the true cost of living to the members in CONUS will be less than that implied by a calculation using lagged expenditure weights. We anticipate that the bias from this source will be small, however, as long as the expenditure weights are updated without too much of a lag. The reason is that we would expect that changes *in relative* prices, which generate this effect, will be small in a quarterly or even annual update.

income increases with household size and pay grade. The concept of spendable income is described in more detail later.

A final concept of the overseas COLA is to hold members harmless for changes in currency exchange rates that would cause the price of goods and services purchased in the local economy to increase in terms of U.S. dollars. This concept is described in more detail later.

2.2 METHODS_____

To calculate the income adjustment needed to help OCONUS members "maintain a CONUS purchasing power level," DoD (1) constructs a market basket of goods and services that reflects the spending patterns of its members, (2) collects information on the prices of items in that market basket—both in OCONUS and in CONUS, (3) creates a cost-of-living index based on these prices, (4) applies the cost-of-living index to estimated spendable income, and (5) updates the index for currency exchange rate fluctuations. ***Figure 1*** provides a brief overview of the process. The following sections describe in more detail the methods and data used to update each of these COLA components.

2.2.1 Market Basket of Goods and Services

The market basket consists of 120 items (e.g., ground beef), separated into 11 categories (e.g., meats/dairy), that reflect the types of goods and services that members purchase (see ***Table 1***).[10] Movement in the price of items in the market basket (e.g., tomatoes) is assumed to be indicative of movement in the prices of related items not in the market basket (e.g., carrots, lettuce). Consequently, there is no need to collect price data on the thousands of different items that members actually purchase.

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[10] The number of categories is somewhat arbitrary. In Table 1 we list 14 categories. Sometimes, when referring to the categories in the market basket, people will combine categories—e.g., combining the Fruits/Vegetables category with the Groceries category.

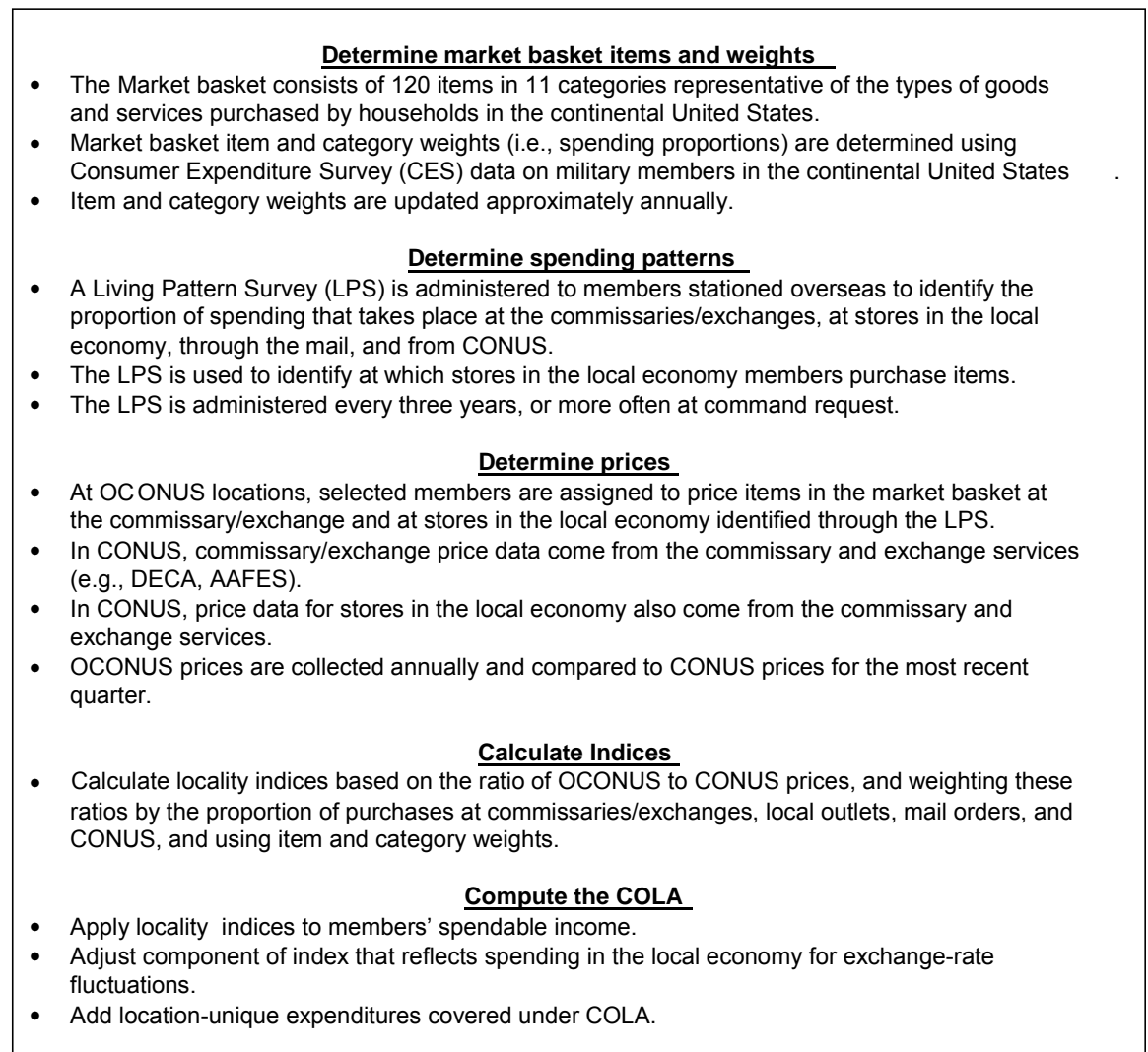**Figure 1. Overview of Overseas COLA Determination Process**

<div style="border:1px solid">

Determine market basket items and weights
- The Market basket consists of 120 items in 11 categories representative of the types of goods and services purchased by households in the continental United States.
- Market basket item and category weights (i.e., spending proportions) are determined using Consumer Expenditure Survey (CES) data on military members in the continental United States .
- Item and category weights are updated approximately annually.

Determine spending patterns
- A Living Pattern Survey (LPS) is administered to members stationed overseas to identify the proportion of spending that takes place at the commissaries/exchanges, at stores in the local economy, through the mail, and from CONUS.
- The LPS is used to identify at which stores in the local economy members purchase items.
- The LPS is administered every three years, or more often at command request.

Determine prices
- At OCONUS locations, selected members are assigned to price items in the market basket at the commissary/exchange and at stores in the local economy identified through the LPS.
- In CONUS, commissary/exchange price data come from the commissary and exchange services (e.g., DECA, AAFES).
- In CONUS, price data for stores in the local economy also come from the commissary and exchange services.
- OCONUS prices are collected annually and compared to CONUS prices for the most recent quarter.

Calculate Indices
- Calculate locality indices based on the ratio of OCONUS to CONUS prices, and weighting these ratios by the proportion of purchases at commissaries/exchanges, local outlets, mail orders, and CONUS, and using item and category weights.

Compute the COLA
- Apply locality indices to members' spendable income.
- Adjust component of index that reflects spending in the local economy for exchange-rate fluctuations.
- Add location-unique expenditures covered under COLA.

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Table 1. Market Basket Categories

Category	# Items in Category	Category Weight
Clothing	9	7.3
Domestics	2	3.0
Food Away	3	10.7
Fruits/Vegetables	8	1.6
Furnishings/Household	6	12.4
Groceries	14	6.6
Meat/Dairy	11	3.9
Medical	9	3.8
Miscellaneous	1	9.4
Personal Care	10	3.9
Phone	3	5.0
Recreation	11	11.3
Tobacco/Alcohol	4	3.2
Transportation	11	17.9
Total	*102[11]*	*100.0*

As discussed previously, each item in the basket is assigned a weight that reflects the proportion of expenditures for that item (and related items) within the category by military members stationed in the continental United States. For example, if fish makes up eight percent of expenditures in the meat/dairy category for the typical CONUS member, then fish is given an item weight of eight percent. If expenditures for meats and dairy products are 3.9 percent of total expenditures, then the meat/dairy category is given a weight of 3.9 percent.[12]

DoD uses expenditure data collected by the BLS through the annual Consumer Expenditure Survey (CES) to determine item and category weights. The weights are determined based on expenditure patterns of members of Uniformed Services who are randomly selected to participate in the CES. The CES is given to a stratified random sample of the U.S. population in CONUS, but military members are not intentionally over- or- under sampled. Consequently, only a small number (i.e., several hundred) military members are randomly selected to participate in the CES each year.

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[11] Although there are 120 separate items in the market basket, some items that are similar are combined.

[12] Thus, fish would have a total weight of 0.312 percent (i.e., 0.08 x 0.039=0.00312) in the market basket.

One problem with using only data on military members in the CES sample to determine item and category weights is that small sample sizes reduce the reliability of estimates. The BLS relies on a large sample to determine item and category weights when analyzing expenditure patterns among the U.S. population. Large samples are especially important to determine weights in categories where consumers make infrequent purchases of high-cost items (e.g., automobiles and major household appliances). To help ensure that the estimated weights in fact reflect the purchasing behavior of military members, DoD generally pools three years of CES data on members to increase the sample size.

An alternative to the current system is to use data on both military members and civilians and data on the entire U.S. population to determine market basket weights. One possibility is to use data on the civilians with incomes similar to those of members to determine item weights but use data on members to determine category weights. Another possibility is to use market basket weights that are a weighted average of expenditure patterns of members and expenditure patterns of civilians.

As discussed previously, the category weights vary (from those in **Table 1**) across OCONUS locations to adjust for differences in climate and living conditions that impose an additional financial burden on the member and his or her dependents. The process for adjusting the category weights is somewhat ad hoc, but reflects input from members stationed at OCONUS locations and reflects the findings of several government studies on the relationship between such factors as (1) climate and food spoilage, and (2) geographic and climate conditions and transportation costs.

2.2.2 Spending Patterns and Price Data

To determine the cost to purchase the market basket at different locations for comparison against the CONUS cost, DoD must collect information on where members shop and then collect price data at those locations. Under the current COLA program, different methods are used in OCONUS and in CONUS to determine shopping patterns and to collect price data. We first describe the process at OCONUS locations, and then describe the process in CONUS.

2.2.2.1 OCONUS Shopping Patterns and Prices

Member shopping patterns are determined through a triennial survey, the Living Pattern Survey (LPS), given to a sample of members at each OCONUS location. (The LPS may be administered more frequently at the

request of a location's command.) The purpose of this survey is to determine the proportion of goods and services in the market basket that members purchase in the local economy, at the commissary and exchange, through the mail, and from CONUS. Also, members are asked to list the stores off base where they purchase these goods and services.

In countries with multiple installations (e.g., Germany), one person is often designated to coordinate data collection efforts across the different locations. Similarly, installations within the same geographic location generally coordinate price collection efforts. DoD shares data collection responsibilities with the U.S. State Department for some locations where both organizations have members stationed. DoD has primary collection responsibilities at approximately 100 OCONUS locations, while the State Department has primary collection responsibilities at approximately 175 locations where DoD members are stationed. This shared responsibility for data collection must be considered when evaluating proposed changes to the overseas COLA program that affect data collection—such as adding items to (or dropping items from) the market basket.

Members often have multiple options concerning where they purchase goods and services. For purposes of computing the COLA, these options are grouped into four venues: (1) the local economy, (2) the commissary and exchange, (3) the mail, and (4) CONUS. The major proportion of expenditures occurs at the first two venues.

Accurately measuring the proportion of expenditures at commissaries/ exchanges and the proportion in the local economy can have a substantial effect on the overseas COLA. There are two reasons for this phenomenon. First, the price of particular items in the market basket can vary substantially between the commissary/exchange and stores off the base. Second, adjustments to the COLA to reflect exchange rate fluctuations apply only to the proportion of expenditures off base. The following equation shows how shopping patterns (e.g., the proportion of shopping at the commissary) are accounted for in the cost-of-living index.

$$Index = \sum_G w_G \sum_g w_g \frac{\sum_v P_{g,v,OC} \times s_v}{P_{g,C}} \ .$$

The price (P) of each item (g) in the market basket is collected for each shopping venue (v) at the OCONUS location. Then, each price is weighted by the proportion of expenditures for the item in each of the four shopping venues, where

$$\sum_{v=local,commissary,mail,CONUS} s_v = 1 \quad .$$

The current system is an expenditure-based system that collects prices where members report shopping. In actual practice, where members shop is determined in part by the availability of goods and services (including the proximity of a commissary/exchange and off-base stores to where members reside and work) and the prices of goods and services in one venue relative to prices in other venues.

Conventional wisdom suggests that the proportion of goods and services purchased from the commissary/exchange is inversely proportional to the distance one resides (or works) from the commissary/exchange. Also, members are more likely to shop at commissaries and exchanges that carry a larger selection of items.

Similarly, in practice members will be "efficient" shoppers and purchase items—especially expensive items or items that constitute a relatively large portion of household expenditures—from the location with the best prices. Thus, if the price of groceries at the commissary is significantly lower than the price of groceries in the local economy, then one would expect members to purchase most of their groceries at the commissary.[13]

OCONUS members purchase some items through the mail or while in CONUS (e.g., prior to relocating overseas). Items purchased through the mail or in CONUS tend to be non-perishable items, such as clothing, and make up a small percentage of household expenditures.

Collecting price data from the local economy for some 100 foreign locations is costly. However, the budget cost is modest because most price data are collected by members assigned to gather the information as collateral duty. Price data are collected annually, although more frequent data collection can occur at the request of a location's command.

Members assigned to collect prices generally have some training in data collection, but little formal training in sampling. Training is usually greater for those collecting data in the larger locations. Typically, the data collector is given a list of items and a list of stores in the local economy that reflect members' responses to the LPS. The data collector will then visit these stores and the commissary/exchange and record the price of items on the list.

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[13] High prices or lack of availability of goods and services in the local economy may drive members at some OCONUS locations to purchase a larger proportion of goods and services from the commissary/exchange than the member desires. This, in turn, may have a perverse effect of producing a smaller COLA referred to by some as a "death spiral." This issue is discussed in more detail in Section 4.

Because stores will carry products of varying quality and different brands, data collectors must use some discretion in choosing items to actually price. Under the current system, members should price those items (e.g., brands) that reflect the brands that members typically would purchase. Items of comparable quality are priced at the different locations. If the item is not available, the member will collect prices for a close substitute or will not report a price for that item. Items are usually priced in per-unit prices (e.g., the price per pound). There are few mechanisms in the current system to ensure that the quality of items priced at OCONUS locations are of comparable quality to items priced at CONUS locations.

Price data for items purchased in CONUS are described in the next section. Items purchased through the mail are priced at CONUS prices plus a surcharge to cover shipping.

2.2.2.2 *CONUS Shopping Patterns and Prices*

To determine the cost of purchasing the market basket in CONUS, DoD must collect and analyze data on the prices of goods and services purchased at CONUS commissaries and exchanges and in the local economy. Every quarter, DoD receives price data for selected items from the Defense Commissary Agency (DECA), the Army and Air Force Exchange Service (AAFES), the Marine Corps Exchange Service (MCX), the Navy Exchange Service (NEX), and the U.S. Coast Guard Exchange Service (CGES).

The commissary and exchange services provide DoD with prices for selected items and with estimates of savings that members realize when they shop for those items at a commissary/exchange relative to shopping in the local economy. The commissary/exchange prices, combined with estimated savings from shopping at the commissary/exchange, are used to estimate prices in the local economy. The process for estimating prices in the local economy can be described mathematically by the following equation:

$$P_{non-commissary,g} = P_{commissary,g} \times (1 + S_{commissary,g}),$$

where $P_{commisary,g}$ is the price of item g at the commissary and $S_{commissary,g}$ is the estimated savings rate from purchasing item g at the commissary relative to purchasing the item from an outlet in the local economy.

The commissary and exchange services estimate savings rates for a subset of the items sold at the commissary/exchange. Items selected by the commissary/exchange services for the price comparison are major volume

items (i.e., items with large total sales) and a sample of other items.[14] The commissary/exchange services then price these items in the local economy where members shop and compare the off-base prices to the commissary/exchange prices.

A fundamental problem in the process used to estimate CONUS prices is the criterion for selection of items by DECA and the exchange services to price in the economy. As indicated previously, all else being equal, the efficient consumer will purchase an item at the location where he or she receives the best price. That is, if an item can be purchased either at the commissary or a local grocery store, and if all other factors are held constant (e.g., the items are of identical quality and both the store and the commissary are equally accessible), then the consumer will purchase the item at the location with the lower prices. Thus, high-volume items at the commissary are more likely to be those items where members realize the greatest savings.

For illustration, consider the following example. Suppose that the member desires to purchase two items—items X and Y. Further, suppose that item X costs $100 at the commissary and $120 in the local economy, while item Y costs $100 at the commissary and $80 in the local economy. The cost to purchase the two items at the commissary is $200 ($100+$100), and the cost to purchase the two items in the local economy is $200 ($120+$80). Assuming that items at the commissary and in the local economy are of equal quality, then the consumer would purchase item X at the commissary and purchase item Y in the local economy for a total cost of $180 ($100+$80). If many members exhibited similar efficient shopping behavior, then item X would be more likely to be chosen by DECA as a high-volume item whereas item Y would not. Estimated savings from shopping at the commissary for item X, relative to shopping in the local economy, is 20 percent (i.e., the non-commissary price [$120] is 20 percent higher than the commissary price [$100]). This selection bias in how items are chosen for price comparisons might overestimate true savings from shopping at the commissary. Consequently, it might over state the price of goods and services in local outlets in CONUS. The result would be to artificially deflate the OCONUS cost-of-living indices and thus the COLA amounts.

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[14] DECA's 1999 Market Basket Price Comparison Study describes the process used to sample commissaries and the process for selecting items for price comparison. DECA selects items that are "clear sales leaders" to represent each category of goods sold at the commissary when comparing commissary prices to private sector supermarket prices. In addition to high volume items, DECA selects a random sample of other items for price comparison.

Thus, the DECA-AAFES price data used to calculate CONUS prices for the overseas COLAs have two potential shortcomings: (a) there is a potential conflict of interest for DECA and AAFES to report private sector prices; and (b) the method for choosing which items to report—the ones with the greatest sales volume in the commissary and exchange—is biased.

DoD also calculates a CONUS COLA—different from the OCONUS COLA—to determine cost-of-living allowances for members living in high-cost metropolitan areas in CONUS. The process used to collect CONUS prices for the CONUS COLA is different from the process used to collect CONUS prices for the CONUS COLA. Historically, DoD has contracted with Runzheimer International to collect prices in the United States for the CONUS cost of living adjustment.

Every three years, Defense Manpower Data Center (DMDC) surveys a random sample of military members using the Living Pattern Survey to determine where the members shop and to determine the portion of spending that occurs at commissaries and exchanges. Then, Runzheimer prices items in the market basket to determine geographic variation in prices throughout CONUS. In *Section 4*, we discuss in more detail the possibility of using Runzheimer price data to calculate the OCONUS COLA.

2.2.3 Spendable Income

An important component of the overseas COLA process is the determination of "spendable income." This is the portion of the member's income to which the cost of living adjustment applies. Members allocate a portion of household income to items not considered living expenses for purposes of the COLA. These items include housing (which is partially covered by a separate housing allowance), savings, and other miscellaneous items (e.g., college tuition). The remainder is "spendable income." Spendable income is expected to rise with total household income and with household size. The *proportion* of military income that is "spendable" declines with income, though, under the current way it is calculated.

The overseas COLA is calculated by applying the cost-of-living index to member spendable income. Mathematically, this is described by the following equation:

$$COLA = (Index - 1) \times S_m,$$

where S_m is the estimate of spendable income for member "m" (given the member's income level and number of dependents).

The spendable income table used prior to FY 2000 is based on data collected by the BLS in 1988-1989. In October 2000, the table will be replaced with one using BLS data from 1997-1998. Failure to update the spendable income table has resulted in "nominal income creep" which reduces the proportion of income protected through the COLA, especially for junior enlisted personnel. This issue is discussed in more detail in *Section 4*.

2.2.4 Currency Exchange Rates

DoD continuously updates overseas COLA amounts to reflect fluctuations in currency exchange rates. If exchange rates become more (less) favorable toward the dollar, then prices on the overseas local economy fall (rise) relative to U.S. prices. Thus, currency fluctuations can affect the prices of goods and services in the local economy and items purchased in the local economy for resale in the commissaries/exchanges (e.g., produce). Currency fluctuations, therefore, can affect the price of locally purchased items relative to CONUS prices and relative to commissary/exchange prices.

The change in relative prices between the OCONUS location and CONUS, and the change in relative prices between the local economy and the commissary/exchange can affect the overseas COLA in two ways. First, price changes will have a direct effect on the cost of living overseas relative to the continental United States. Second, the change in prices can influence the proportion of household expenditures at the commissary/exchange.

PDTATAC analyzes currency exchange rates bi-weekly to determine their direct effect on the price of items purchased in the local economy. Only the component of the cost-of-living index that reflects spending in the local economy is adjusted. Commissary prices are assumed to remain unchanged even though some items (e.g., perishable produce) are purchased in the local economy and thus may change in price.

PDTATAC obtains information on daily exchange rates from three sources. In countries with a major command, the COLA point-of-contact typically provides PDTATAC with information on the daily exchange rate paid by members at on-base currency exchange facilities. PDTATAC obtains exchange rate information for the remaining countries from both the Wall Street Journal and the Regional Administration Management Centers (RAMCs).[15] The Wall Street Journal and RAMC exchange rate

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[15] RAMCs are State Department Centers that purchase local currency for U.S. embassy transactions.

quotations do not include the service charges and commissions typically paid by military members when they exchange currency. To offset the exclusion of the services charges, PDTATAC uses the exchange rate reported by the Wall Street Journal or RAMC that is most advantageous to the member.

To reduce the frequency of modifications to COLA amounts, PDTATAC adjusts COLA amounts for currency fluctuations only when the actual exchange rate exceeds the exchange rate used to determine the current COLA amount by a specified threshold. PDTATAC compares the actual daily exchange rate (E_a) to the exchange rate used to determine the current COLA (E_c) and updates the exchange rate used for COLA determination when the cumulative difference in E_a and E_c at time T exceeds 5 percent. That is, when:

$$\frac{\left(\sum_t \left(E_{a,t} - E_{c,t} \right) \right)}{E_{c,t}} > .05$$

then E_c is replaced with E_a. A new E_c results in a new cost-of-living index and a modification to the COLA amount. Prior to September 1999, the threshold for revising the COLA due to changes in exchange rates was 10 percent.

Because the LPS is administered approximately every three years at a location, changes in members' on/off base shopping patterns caused by changes in the relative price of goods in the local economy are not reflected automatically in the cost-of-living index. Likewise, any change in the prices of goods and services are not incorporated into the cost-of-living index until the next annual price survey is completed. The local command can, however, request an out-of-cycle LPS or an out-of-cycle price survey. The issues of changing shopping patterns and changing prices caused by rapid and significant changes in the exchange rate are discussed in more detail in *Section 4*.

2.2.5 Location-Unique Expenditures

At some OCONUS locations, members incur expenses that are not incurred by members in CONUS. These location-unique (or "COLA-unique") expenses typically are not captured in the cost-of-living index because the items are not part of the market basket or, if they are included in the basket, are not considered in the appropriate quantities. Under the current system, DoD increases COLA amounts in some locations to cover these additional expenses incurred by members. The process used to

determine which of these location-unique expenses will be covered under the COLA and the process used to determine payment amounts is discussed in more detail in *Section 4*.

3. PRIVATE SECTOR AND OTHER ORGANIZATIONS

International companies, governments, and international organizations generally provide various living allowances and other pecuniary benefits to their members stationed overseas. There are many similarities between DoD and these organizations in terms of the types of compensation paid for overseas assignment and the COLA determination process. There are also many differences.

In this section we summarize the compensation practices and COLA determination processes common in the private sector and the practices and processes used by other organizations with employees assigned overseas (i.e., the U.S. Department of State, the Office of Personnel Management, and the World Bank[16]). Then, we compare the COLA programs of these organizations to DoD's overseas COLA program and discuss the implications if DoD where to implement some of the practices used in the private sector and other organizations.

Best practices in the private sector and international organizations, and the feasibility of their application to the military overseas COLA, should be considered with the understanding that the purpose of the military's overseas COLA program, and the institutional structure in which it is applied, is different than that of international companies. The Department's case differs from that of typical international companies in several important ways. First, most international companies only relocate company executives, senior managers, and technical specialists from the U.S. to overseas locations. They typically hire indigenous workers to perform most tasks. The Uniformed Services, on the other hand, relocates members at all levels to OCONUS locations.[17] Second, many global companies negotiate individual compensation packages with employees

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[16] The United Nations and International Monetary Fund both use the same COLA program as the World Bank

[17] The two main categories of expatriates consist of managers and employees with technical skills that are not readily available in the overseas location. In a 1996 survey by Foster Higgins International of 171 U.S. and Canadian employers with employees stationed overseas, only 23 percent of surveyed companies placed junior-level employees overseas (Prince, 1996).

who are being considered for overseas assignments. Thus, in addition to cost-of-living increases employees may receive additional compensation for hardships associated with overseas assignments. When employers negotiate individually with employees, the individual circumstances of employees can be taken into account when the compensation package is formulated.[18]   The Uniformed Services do not, and cannot, negotiate separate compensation agreements. Third, in the private sector overseas assignment is voluntary.[19] This is typically not the case in the Uniformed Services. Fourth, global companies do not typically have Congressional oversight.

3.1 PRIVATE SECTOR PRACTICES _____

Private sector corporations face many of the same problems as the Uniformed Services in selecting and assigning staff (i.e., "expatriates") for foreign duty. These include family considerations, spouse career and employment, and subsequent retention. To attract employees to overseas assignments, motivate them, and retain them, the companies often pay substantial allowances and premiums in addition to base salaries.

To identify best practices in the private sector for compensating expatriates and for determining COLAs we interviewed human resource specialists at major international companies[20], conducted a review of literature on the subject, and contacted companies that specialize in providing COLA-related information and services. Many of the compensation policies and practices found in the private sector are similar to those used by the Uniformed Services to compensate members assigned overseas. Many policies and practices, however, are found only in the private sector.

The traditional approach used by the private sector to determine compensation for expatriates is referred to as the "balance-sheet"

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[18] Individual (or family) circumstances include whether dependents will attend a private or public school while living overseas, and the standard of living the employee and his or her depends expect to maintain.

[19] Arguably, international companies can "force" employees to accept overseas assignments with the threat of adverse consequences to their careers (e.g., job loss). Based on our review of the literature and interviews with human resource specialists at major international companies, most employees selected for overseas assignments either volunteer for the assignment, accept the assignment as a necessary requirement in their career progression, or are induced with higher compensation to accept the assignment.

[20] We interviewed human resource specialists at Daimler Chrysler, Quintiles Transnational Corp., Ford Motor Company, International Business Machines (IBM), and Glaxo Welcome.

approach. Balance-sheet compensation policies were developed in the 1950s and 1960s with the objective to keep the expatriate from suffering any *financial loss* or decline in *standard of living* when taking an overseas post.

To prevent expatriates from suffering *financial loss* when taking an overseas assignment, international companies typically pay different types of allowances—including cost-of-living allowances, housing allowances, travel allowances, education allowances, and foreign tax allowances— when the cost for these goods and services exceed those typically found in the United States. To prevent expatriates from suffering a decline in *standard of living* when taking an overseas assignment, international companies will often pay premiums (e.g., for hardship and danger).

Based on our review of the literature and discussions with international human resources specialists, companies with large expatriate populations tend to have well defined (and inflexible) policies for determining overseas allowances and premiums and for assigning employees to overseas posts. Companies with smaller expatriate populations, on the other hand, tend to structure individual packages to reflect the specific needs and purpose of the assignment (Carey, 1995). In addition, companies generally are more flexible when they determine the compensation package for executives relative to junior and mid-level employees. For example, executives are more likely to receive perks and benefits such as the use of a company vehicle, a home security system, and completion bonuses. In a recent survey by Towers Perrin, 70 percent of respondents recognized that there are different kinds of expatriates, and about 50 percent indicated their company pays differently according to type (Mervosh, 1997).

Below we discuss the two main types of compensation paid specifically for overseas assignments (i.e., allowances and premiums), but we focus our discussion on cost-of-living allowances. In addition, we present findings from our literature review on important issues in the private sector relating to assigning employees to overseas posts.

3.1.1 Cost of Living Allowance

Most international companies pay a cost-of-living allowance to expatriates assigned to high-cost areas overseas. The purpose of this allowance, similar to the overseas COLA paid by DoD, is to put the expatriate on an economically equal footing with employees who remain in the U.S. That is, the expatriate should not suffer economically from differences in cost-of-living between the assignment location and the U.S.

International companies typically outsource the function of determining living allowances. We identified the six major suppliers of COLA data to the private sector (***Table 2***).

Table 2. Private Sector Suppliers of International Cost-of-Living Data

Organization	# Cities Where Data Are Collected	# Clients	Frequency of Data Collection
Associates for International Research Inc. (AIRINC)	300+ overseas	300+	6 months
Economic Research Institute (ERI)	1400 overseas	NA	continuous
Economist Intelligence Unit (EIU)	123 overseas	NA	6 months
Employment Conditions Abroad (ECA)	235 overseas	1,300	6 months (more for areas with high inflation)
Organization Resources Counselors, Inc. (ORC)	300+ overseas	1,600	continuous
Runzheimer International	200 U.S. and 100 overseas	1000+	continuous

These six organizations collect price data for a market basket of goods and services in major cities throughout the world. These organizations then use this information to compare the cost-of-living between cities, or between specific cities and a national average. For example, U.S. international companies may contract with one of these six suppliers to provide information on the cost-of-living at overseas locations relative to the overall cost-of-living in the U.S., or relative to the cost-of-living at a particular city in the U.S. (e.g., where the international company is headquartered).

These six organizations produce variations of two types of cost-of-living indices. "Standard" cost-of-living indices show the relative price across cities of purchasing a basket of goods that reflects U.S. consumption patterns. Mervosh (1997) comments that the standard indices used by most companies accentuate the cost-of-living differences between the U.S. and foreign cities because they assume upscale shopping patterns. "Efficient purchaser" indices reflect how consumers shop if they have lived in a location for a while and know where the bargains are. Thus, the index values for efficient purchaser indices are lower than the values for standard indices. These six organizations use the cost-of-living indices to provide their clients with tables showing the COLA amounts by household income level and by family size for each overseas location.

For proprietary reasons, these six companies provide little information on their process for collecting price data and constructing the cost-of-living indices. Some information, though, was obtained from the organizations' internet web sites and by contacting the companies. We provide a brief summary of the companies below and compare index values for selected overseas locations in a later section. The companies are listed alphabetically.

- *Associates for International Research Inc. (AIRINC)* collects price data in over 300 cities throughout the world. The data are collected by pricing agents every six months. AIRINC computes cost-of-living indices using the following process. First, AIRINC analyses expenditure data in different countries to identify market baskets of goods and services and to identify weights for each item in the basket. The market basket changes by country. Thus, international companies headquartered in different countries can base their COLAs on the market basket that best reflects consumption patterns in their own country. Second, AIRINC periodically conducts surveys of expatriate living patterns in cities throughout the world. Third, AIRINC surveys retail prices at each foreign location every six months. Fourth, the company calculates foreign expenditures for the market basket and compares foreign and home country expenditures to create cost-of-living indices. Finally, AIRINC combines the cost-of-living indices with information on income level and family size to generate a table for each location showing the COLA for each income level (in increments of $100) and family size (up to seven family members).

- *Economic Research Institute (ERI)* provides companies with the computer software and data to compare the cost of living between over 5,900 U.S. and Canadian cities and 1,400 international locations. The database containing price information is updated continuously using data compiled from published surveys and reports.

- *The Economist Intelligence Unit (EIU)* computes a cost-of-living index every six months for 123 of the world's major economic centers. The study uses a lengthy list of corporate essentials to compare the cost-of-living in different cities. Fox (1998) comments that the EIU cost-of-living index demonstrates a poor correlation between cost-of-living and perceived level of luxury (or standard of living). The EIU index appears to be designed primarily to calculate living

allowances for highly compensated business executives and their families stationed overseas.

- ***Employment Conditions Abroad (ECA)*** computes a cost-of-living index every six months for 235 locations worldwide. ECA publishes three different indices. The "Standard Home-Based" Index assumes the expatriate purchases the same basket of goods that would be purchased in the U.S., but that the expatriate shops less cost-effectively abroad than at home. The "Cost-Effective Home-Based" Index assumes the expatriate purchases the same basket of goods that would be purchased in the U.S., but that the expatriate shops as cost-effectively abroad as at home. The "Cost-Effective International" Index assumes the expatriates' purchasing patterns are similar to those of an international lifestyle. ECA was originally created as a non-profit organization sponsored by 35 multinational firms. The purpose of creating the organization was to combine the resources of the member firms to collect cost of living data, and then make the data available to the member firms. One of ECA's main sources of price and expenditure data is the expatriates themselves. During certain times of the year, the employees (or their spouse) keep a diary of all expenditures—including quantities and prices. The survey participants receive nominal compensation (e.g., a gift certificate for dinner at a nice restaurant). Because information is collected by expatriates of a large number of firms, the combined number of survey participants is generally sufficient to provide reliable estimates of purchasing behavior and prices. ECA supplements data collected by expatriates with data on consumption patterns and prices collected by professionals employed by ECA.

- ***Organization Resources Counselors, Inc. (ORC)*** collects price data in over 300 cities in more than 40 countries. ORC provides both a "standard" cost-of-living index that keeps the expatriates' purchasing power comparable to that in the home country, and designs customized "efficiency" indices that assume the expatriates adopt the purchasing patterns of nationals in the overseas location. ORC collects data through a large number of pricing agents. Data are collected continuously, so companies can purchase up-to-date information.

- ***Runzheimer International*** produces two overseas cost-of-living indices. The "Standard" plan uses the traditional balance sheet approach which assumes a local national lifestyle in the home country and a traditional expatriate lifestyle in the assignment location. The "Corporate" plan is an efficient purchaser plan that assumes the expatriate modifies his or her lifestyle in the assignment area. Runzheimer's pricing agents continuously collect price data, so clients can purchase up-to-date cost-of-living data. One major difference between Runzheimer's indices and the OCONUS COLA index is that the Runzheimer index for a given location varies by income level. The rationale for this variation by income is that the market basket of goods and services consumed varies by income level. DoD, on the other hand, calculates one index value for each location regardless of income level.

3.1.2 Premiums and Other Special Pays

In addition to living allowances, international companies often pay premiums and other special pays to encourage employees to accept overseas assignments and to compensate for factors that may reduce the expatriates' standard of living. These premiums and special pays include foreign service premiums, hardship and danger premiums, and compensation for lost spousal income.

International companies have traditionally paid foreign service premiums as an inducement to accept a foreign assignment (Kates and Spielman, 1995). Mervosh (1997) reports that foreign service premiums generally are a percentage of base salary (often as much as 15 percent), and are paid for making what has traditionally been considered a high-risk career move. Kates and Spielman report, though, that companies are eliminating this premium as foreign assignments become more desirable and as foreign assignments become an integral part of the career development process.

The second category of premiums is hardship and danger premiums. These are paid when conditions that affect the standard of living vary substantially from one location to another. Swaak (1997) reports that many companies that pay hardship and danger premiums base their premiums on the hardship and danger pay allowances calculated by the U.S. Department of State, although private sector companies sometimes pay higher premiums than the federal government's maximum rate of 25 percent of base salary.

Some international companies provide other special pays or reimbursements to employees assigned overseas. The two most relevant to this project are pay for lost spousal income and an education allowance.

According to Organization Resources Counselors, Inc. (ORC, 1995), the management of dual-career couples on international assignment is one of the five most important international human resources challenges facing international companies in the coming decade. In many international companies, employees must apply to be considered for an overseas assignments.[21] Thus, the potential loss of spousal income is one factor that the employee must consider in making the decision to apply for an overseas assignment. In other companies, however, employees are assigned overseas as part of career development or to meet a specific need of the company.

ORC (1995) reports that ninety percent of the 144 international companies they surveyed indicated that they ***do not*** compensate expatriates for loss of spousal income when the employee is transferred overseas. Respondents in the ORC survey stated that the multiple variables involved in each dual-career overseas relocation make policy development extremely difficult. Swaak (1995) reports that few of the companies he surveyed provide any form of income replacement to spouses who give up their jobs to accompany expatriates on foreign assignments. Instead, most companies provide employment assistance services to help spouses find new employment at their new location. Companies that do provide income replacement for lost spousal income generally do not exceed two or three months of lost base salary. One company surveyed by Swaak reported that it negotiates income replacement for one year. One of the international firms we contacted, Quintiles Transnational Inc., reported that they reimburse a small number of company executives assigned to overseas posts for up to two years of lost spousal income.

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[21] Daimler Chrysler Corporation is one example of an international company where overseas assignments are voluntary. Chrysler posts an internal job opening when there is an overseas position that the company wishes to fill. Candidates must apply for the overseas position and undergo a rigorous selection process. The selection process is much more rigorous than the process to hire employees in the U.S., and the candidates for overseas employees and the candidates' families undergo a series of diagnostic tests. The position is filled with the candidate with the best qualifications—cost is a distant secondary consideration. Chrysler has approximately 500 expatriates throughout the world. Approximately 350 of these employees are U.S. citizens stationed overseas, and the remaining 150 are foreign nationals stationed both in the U.S. and in foreign companies. Chrysler expatriates consist of company executives, managers, and technical professionals.

Mervosh (1997) reports that most international companies provide generous education allowances for dependents of expatriates. A 1996 survey undertaken by the Monks Partnership found that the provision of educational costs for expatriates' children decreased between 1993 and 1996. In the 1993 survey, 69 percent of companies paid home boarding school fees. In 1996 the number fell to 42 percent of companies.

3.2 OTHER ORGANIZATIONS _____

United States federal government agencies such as the State Department and the Office of Personnel Management (OPM), and international agencies such as the World Bank, the United Nations (UN), and the International Monetary Fund (IMF) have a large number of employees assigned to overseas locations. The COLA programs and policies of these organizations are similar in many ways to those of the Uniformed Services. There are, however, some important differences. Below we describe the COLA programs for the U.S. State Department, the Office of Personnel Management, and the World Bank. (The COLA programs of the UN and the IMF are identical to the World Bank's COLA program.) Then, we discuss the implications if the Uniformed Services were to adopt certain practices of these organizations.

3.2.1 U.S. State Department

Like DoD, the State Department pays a cost-of-living allowance to employees assigned outside the continental U.S. The State Department calculates a cost-of-living allowance for State Department employees stationed overseas in much the same way that DoD calculates the overseas COLA. In fact, the State Department and DoD share much of the data used to compute cost-of-living indices in locations where both organizations have members stationed.

There are five major differences in the methodology used by the State Department and DoD to determine overseas COLA amounts.

- First, to compute a cost-of-living index the State Department compares the cost of living in the overseas location to the cost of living in Washington, D.C. DoD, on the other hand, compares the cost of living at the overseas location to the average cost of living in CONUS.

- Second, the State Department does not pay a COLA if the cost-of-living index is below 103 (where 100 represents parity in prices between the overseas location Washington,

D.C.). DoD pays a COLA whenever the index value exceeds 100.9.

▪ Third, the category weights in the market are different for the State Department and DoD. The category weights used by the State Department are based on Bureau of Labor Statistics (BLS) data for the Washington D.C. metropolitan area. The category weights used by DoD are based on three years of BLS data of military members who participated in the consumer expenditure survey.

▪ Fourth, DoD uses the LPS to determine the percentage of spending that members incur outside the foreign country of assignment. This percentage varies by location. The State Department, however, calculates cost-of-living indices using the assumption that 15 percentage points of the cost-of-living index represents consumer expenditures outside the foreign country of assignment. Thus, to calculate a new index when there are fluctuations in the exchange rate the State Department uses the following formula:

$$\text{new index} = 15 + (\text{local index} - 15) \times \left(\frac{\text{old exchange rate}}{\text{new exchange rate}} \right).$$

▪ Fifth, the State Department uses a different process than does DoD to adjust the COLA at a given location due to minor adjustments in the cost-of-living index. The State Department uses the following table (***Table 3***) to determine what range the cost-of-living index is in, and then uses the product of the midpoint of the range and estimated spendable income for each member to compute the COLA for each member at a given location.

In addition to cost-of-living and housing allowances, the State Department pays a "hardship" premium and a "danger" premium for employees stationed in locations where living conditions are more onerous or more dangerous, respectively, than in the U.S. The purpose of these premiums is to compensate employees assigned to areas where the perceived standard of living is lower than in the U.S. Also, because the assignment of State Department employees is largely voluntary, the premiums help recruit State Department employees to locations with more onerous or dangerous living conditions. At locations where these premiums are paid, the hardship premium ranges from 5 to 25 percent of base salary, while the danger premium is 15 to 25 percent of base salary.

Table 3. Local Cost-of-Living Index and Percent Applied to Spendable Income to Determine Post Allowance

Local Index	Percent applied to spendable income	Local Index	Percent applied to spendable income
103-107	5	166-175	70
108-112	10	176-185	80
113-117	15	186-195	90
118-122	20	196-205	100
123-127	25	206-215	110
128-132	30	216-225	120
133-137	35	226-235	130
138-145	42	236-245	140
146-155	50	246-255	150
156-165	60	256-265	160

Source: U.S. Department of State 1999 Quarterly Report Indices, Table A..

To calculate hardship premiums for a location, the State Department assesses living conditions in the following 15 categories: isolation, education, community, facilities, food, importation, altitude, climate, housing, recreation, natural hazards, sanitation and disease, crime and harassment, medical facilities, and political violence. These 15 categories are sub-divided into approximately 124 factors, which are given weights.

The State Department computes a danger pay index that is used to determine danger pay premiums for employees assigned to locations plagued by civil revolution, civil war, or terrorism—i.e., conditions that threaten physical harm or imminent danger to the expatriates' health or well-being.

The State Department offers a 'Foreign Transfer Allowance' that covers expenses typically covered by DoD under the Permanent Change in Station (PCS) move program. Some expenses covered in this allowance, though, are expenses considered for coverage in the OCONUS COLA (i.e., as "COLA Unique" expenditures). For example, the allowance covers pet quarantine expenses, conversion of electronic equipment to use native utilities, costs to alter automobiles to comply with local laws—e.g., catalytic converter installation, and automobile registration fees. These expenses are covered on a reimbursement basis.

In addition, the allowance includes a wardrobe component designed to allow recipients to purchase special clothing required by the country's climate. Overseas locations are grouped into three zones according to

climate, and there are three categories of family size. The flat rate expense covered is intended only to offset a part of the wardrobe cost implied by a shift from a Zone 1 area with a cold climate, such as Alaska, to a warm Zone 3 climate, such as Puerto Rico, or vice versa. The allowance also covers moving expenses such as food and lodging, travel costs, connection fees for appliances and utilities, and various housing costs (e.g., expenses associated with breaking a lease or non-refundable agent fees).

3.2.2 Office of Personnel Management

The Office of Personnel Management (OPM) has responsibility to determine the cost-of-living allowance paid to approximately 44,000 federal government employees (excluding military members) assigned to Alaska, Hawaii, Guam, Puerto Rico, the Virgin Islands, and the Northern Mariana Islands. OPM's method for determining COLAs is similar to DoD's method, but there are four important differences that we list below.[22]

- First, like the State Department, OPM compares the cost of living at the OCONUS location to the cost of living in Washington, D.C. That is, the COLA is based on the cost to purchase a fixed market basket of goods and services at the overseas location relative to the cost to purchase the same market basket in Washington, D.C.

- Second, OPM includes housing in the market basket used to calculate cost of living. DoD, on the other hand, has a separate allowance for housing.

- Third, by law, the OPM COLA is limited to a maximum of 25 percent of basic pay. The COLA is exempt from federal taxes, but is subject to state and local taxes.

- Fourth, OPM calculates separate cost-of-living indices for three income levels. Data from the national Consumer Expenditure Survey (CES) are used to determine which goods and services are in the market basket and the weights assigned to each item. Separate indices are calculated for upper income, middle income, and lower income households by using market basket weights that more closely reflect consumption patterns for upper income, middle income, and lower income households, respectively. Linear regression is

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[22] Information on the methods used by OPM come mostly from: Report on 1996 Surveys Used to Determine Cost-of-Living Allowances in Non-foreign Areas, Federal Register, Vol. 62 No. 57, Tuesday, March 25, 1997, 14190.

used to derive weights for the components at each income level and in categories by regressing expenditures reported in the CES data on characteristics such as income level and family size.[23] The following table (***Table 4***) illustrates how expenditure patterns vary by income level.

Table 4.   Typical Consumer Expenditures By Income Level and Market Basket Category

Income Level	Goods and Services	Housing	Transportation	Misc.	Total
Lower	$8,558 (40%)	$5,556 (26%)	$3,992 (19%)	$3,465 (16%)	$21,571 (100%)
Middle	$12,821 (39%)	$8,8047 (24%)	$5,994 (18%)	$6,037 (18%)	$32,899 (100%)
Upper	$19,300 (38%)	$11,710 (23%)	$9,044 (18%)	$10,246 (20%)	$50,300 (100%)

Source: Federal Register, Vol. 62, No. 57, March 25, 1997, p. 14198, Table 2-2.

The cost-of-living indices are updated annually. Historically, most of the data collection and analysis effort to compute COLAs was performed by a contractor. A sample of federal government employees in both the Washington D.C. metropolitan area and the overseas locations do participate, however, in a survey designed to identify where federal government workers shopped. Currently, federal government workers and their union representatives pay a more prominent role in determining the COLAs. In April 1996, OPM and the plaintiffs in *Alaniz* v. *Office of Personnel Management* and *Karamatsu* v. *United States* entered into a Memorandum or Understanding to resolve long-standing issues regarding OPM's COLA program. Under court-approved agreement, representatives of the federal employees affected by the COLA began to play a more prominent role in designing the survey used to collect data to determine the COLA and to oversee the data collection efforts. In regions where non-military employees have access to commissaries and exchanges, such as Guam, they are used for local retail pricing. To calculate the cost of the

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[23] "To determine the appropriate income levels, OPM analyzed the 1995 distribution of salaries for General Schedule employees in all of the ... areas combined... [and] divided this distribution" into three equally sized groups. Median incomes for each group were taken and rounded to the nearest $100 to obtain representative incomes of $21,600, $32,900, $50,300. These values are used to produce three sets of expenditure levels for each region and Washington, D.C. These estimated expenditures are then weighted and eventually combined into a single index for each region (Source: Federal Register, Vol. 62, No. 57, March 25, 1997, pg. 14196).

market basket in Guam, the assumption is made that 70 percent of food and home items are purchased at the commissary.

3.2.3 World Bank

The World Bank assigns staff members to numerous countries on both temporary and long-term assignments. Currently, there are approximately 350 American World Bank employees assigned overseas. To serve these employees, the bank has a department that monitors the costs of living abroad and makes adjustments in the living allowances paid to its employees. In this summary we focus on the COLA paid to U.S. employees stationed outside the U.S. The process used by the bank to calculate COLAs is similar to that used by DoD. There are, however, some fundamental differences that we list below.

- First, the bank uses the U.S. State Department's private sector Index of Living Costs Abroad that compares living costs between the Washington, D.C. Metropolitan Area and overseas locations. The State Department's private sector cost-of-living index is similar to the locality index the State Department uses to determine COLAs for its own members, but assumes the individual stationed overseas does not have access to commissaries and exchanges on U.S. military installations. The bank calculates its own cost-of-living index for those few duty stations for which the U.S. State Department produces no index.

- Second, the category weights in the market basket are different than those used by DoD. The category weights used by the bank reflect purchasing patterns of Washington-based families. The category weights are adjusted for each overseas location, however, based on survey data collected from World Bank employees. For example, food spoilage occurs more frequently in locations with warmer climates so the category weight for food expenditures is increased in these locations.

- Third, the bank updates the cost of living indices quarterly (i.e., in January, April, July and October) for movements in the exchange rates and inflation rates.[24] The bank assumes that 20 percentage points on the index represents spending

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[24] For quarterly review and updating, the bank uses CPI and exchange rate data published by the IMP. For some countries, the UNDP published exchange rate data are used while the INSEE/Paris CPI data are used for some francophone countries.

that is done outside the assigned location (and thus is not adjusted for changes in the exchange rate or the Washington, D.C. consumer price index [CPI]). The following formula is used to make quarterly adjustments in the cost-of-living index:

$$\text{new index} = 20 + (\text{old index} - 20) \times \left(\frac{\text{old exchange rate}}{\text{new exchange rate}} \right) \times \left(\frac{\text{old Washington D.C. CPI}}{\text{new Washington D.C. CPI}} \right).$$

- Fourth, one of the distinguishing features of the bank's COLA is the use of a "safety net". Every year a base COLA is determined. The COLA is updated quarterly using the formula described above. The safety net policy at the World Bank means that if fluctuations in the exchange rate or the Washington, D.C. CPI cause the quarterly updated COLA to fall below the year's base COLA, then the base COLA amount is retained. The safety net does not prevent the base COLA from falling from one year to the next, though. Upward adjustments in the COLA cannot exceed 30 percent of the year's base COLA.

- Fifth, like the State Department, the World Bank has different ranges for the cost-of-living indices. The cost-of-living differential paid at a given overseas location is the midpoint of the range into which the location's cost-of-living index falls. For example, if the index is between 105 and 109, then a cost-of-living differential of 7.5 percent is given. For indices between 110 and 114, a 12.5 percent adjustment is made. The maximum COLA differential payable for any post is 97.5 percent.

- Sixth, the World Bank calculates the COLA using the assumption that 40 percent of the salary is spendable income, regardless of family size or income level.

The World Bank provides other allowances and benefits to its employees stationed out of country. Before transferring overseas, the member is allowed a pre-assignment visit. In addition to travel and shipping costs associated with the transfer, the employee receives a relocation grant to cover miscellaneous costs such as food and lodging costs associated with the move. Employees transferred overseas receive an assignment allowance of $25,000. Half of the allowance is paid at the beginning of a tour (which usually is for three to four years), and half is paid on the third anniversary of the tour. The bank pays a locality

premium, or hardship premium, to bank employees posted in locations with more onerous living conditions. The premium is based on the United Nations Hardship Rating Scheme, which is different than the scheme used by the State Department. In addition, employees living in a location that is especially dangerous receive a hazard premium. Members receive an education allowance for dependents in primary or secondary education. The bank also pays a housing and utilities allowance. The employee contributes a specified amount of money towards housing and utilities, and the bank pays all costs above the employee contribution up to a ceiling. Finally, the employees receive a home leave allowance that pays for the employee and his or her dependents to travel to the U.S. once per year.

3.3 COMPARISON OF COLA PROGRAMS _____

In the following table [Table 5], we summarize similarities and differences between the COLA programs used by DoD, the private sector, the State Department, OPM, and the World Bank.

4. ISSUES AND ANALYSIS OF THE CURRENT SYSTEM

The goal of the current system is to calculate and pay members a COLA that holds members financially harmless for the potentially higher cost of living they may experience in an overseas assignment. A number of factors make it difficult to realize this goal. Theoretical issues, themselves, make this goal impossible to realize fully in practice. Members have different tastes. Consequently, a single "market basket" cannot be literally correct for everyone. Moreover, members can substitute goods and service in response to differences in relative prices between the overseas location and the United States, allowing them to achieve a given level of well-being at lower cost. This cannot be captured in an index. Practical issues add further complication. Limitations on price measurement and data collection, time lags in adjustment, location-unique circumstances, and member circumstances make exact realization of the ideal infeasible in practice.

Table 5. Comparison of COLA Systems

	DoD	Private Sector	State Department	OPM	World Bank
Recipients	▪ Approximately 280,000 members of the Uniformed Services stationed outside the continental U.S.	▪ Varies, but generally corporate executives, managers, and highly trained specialists	▪ Federal Employees living outside the U.S. and its territories	▪ Approximately 44,000 federal employees living in Alaska, Hawaii, and U.S. territories	▪ Approximately 350 American World Bank employees assigned overseas
Market Basket	▪ Items and category weights based on CES data ▪ Reflects expenditures of Military members in CONUS ▪ Category weights adjusted in some OCONUS localities	▪ Private sector market baskets are often modified versions of the CES market basket ▪ Weights are adjusted to different localities, income levels ▪ Some companies use a Balance Sheet" approach that assumes a U.S. lifestyle ▪ Some companies use an Economy" approach that reflects a modified lifestyle	▪ Items and category weights based on CES data ▪ Reflects expenditures of Washington, D.C. population	▪ Items and category weights based on CES data ▪ Reflects expenditures of Washington, D.C. population ▪ Expenditures are measured at three different income levels	▪ Category weights are adjusted at some locations to reflect expenditure patterns of surveyed World Bank employees stationed overseas
Exchange Rate and Data Adjustments	▪ Indices are adjusted to reflect exchange rate differences each pay period, but only if the change exceeds the threshold.	▪ Varies depending on company, policies	▪ COLA adjustments made only if exchange rate fluctuation causes the cost-of-living index to move outside of a range	▪ None (All locations use U.S. currency)	▪ Adjusted quarterly
Spendable Income	▪ Index is applied to a spendable income table	▪ Varies, cost-of-living indices are constructed on spendable income, actual salaries, or other methods	▪ Index is applied to a spendable income table	▪ Index is applied to recipients' spendable income based on total basic pay derived from GS schedule and dependents	▪ Assumes 40 percent of salary is spendable income regardless of income level and family size

Table 5. Comparison of COLA Systems (continued)

	DoD	Private Sector	State Department	OPM	World Bank
Price Data and Collection	• Triennial LPS used to identify where members shop, and proportion of expenditures at each source • Price collected annually by designated military member at OCONUS location • CONUS prices from commissaries/exchanges and price data for items in the local economy provided quarterly by commissary/ exchange services, and from other sources • DoD collects price data at approx. 100 locations • DoD receives price data from State Department for approx. 175 locations.	• Data collection outsourced to private companies • Price data collected both at upscale stores and at stores where "efficient" consumers are expected to shop	• Prices are collected annually by assigned State Department employee at each OCONUS location • BLS collects price data in Washington, D.C.	• Prices are collected annually both in the DC area and other locations by DC based federal employees, with observers from the allowance areas • Items are priced at available local outlets (including PX, where available), and through catalogues, where this is common practice	• Does not collect price data—uses State Department's private sector cost-of-living index
Allowance Calculation	• Compares overseas location cost of living to CONUS average cost of living	• Compares overseas location cost of living to U.S. average, or to a specific city	• Compares overseas location cost of living to Washington, D.C. cost of living • Index values fall into a range, and the midpoint of the range is applied to spendable income to determine the COLA	• Compares location cost of living to Washington, D.C. cost of living • Separate cost-of-living indices are created for each of three income levels	• Same as State Department methodology

Table 5. Comparison of COLA Systems (continued)

	DoD	Private Sector	State Department	OPM	World Bank
Other Special Pays/ Allowances	• Department of Defense Dependent Schools (DoDDS) • Housing allowance • "COLA-Uniques"—e.g., UK TV tax, Singapore car tax	• Education allowance for dependents • Housing allowance • Travel allowance • Automobile allowance • Hardship allowance • Danger allowance • Allowance for lost spousal income or transition benefits (provided by some companies)	• Foreign Transfer Allowances—includes PCS move expenses as well as expenses for pet quarantines, automobile registration, removal or installation of legally required automobile parts—e.g., catalytic converter • Wardrobe expenses—to purchase new clothes when transferred to a location in a different climate zone (amount depends on zone change and number of dependents) • Hardship allowance • Danger allowance	• None (housing included in cost-of-living allowance)	• Pre-assigned visit • Relocation grant (to cover misc. expenses in addition to PCS move expenses) • • Assignment premium ($25k paid half at beginning of assignment and half on third anniversary) • Locality premium (or "hardship" pay) • Hazard premium • Housing and utility allowance • Education allowance for dependents • Home leave allowance—one trip home per year

Nevertheless, it is possible to get closer to the ideal. In this section we address some of the major issues surrounding the current system and we discuss possible changes and improvements to the system that, we believe, would tend to move the system closer to the ideal. Specifically, we address (1) ways to better reflect true cost of living differences, (2) ways to eliminate current practices that are perceived as inequitable (e.g., overseas COLA reductions that result when CONUS prices rise faster than OCONUS prices) or that significantly disadvantage the member and his or her family, and (3) ways to improve data collection and technical validity.

We address these issues in the following order: (1) cost-of-living index issues, (2) data collection issues, (3) spendable income issues, (4) location unique expenditures, and (5) COLA adjustment issues.

4.1 THE COST-OF-LIVING INDEX _____

4.1.1 Type of Index

The cost-of-living index for the overseas COLA is nominally a "Laspeyres" index. As described in *Section 2*, a Laspeyres index is one in which the cost to purchase a fixed market basket of goods and services is determined at two or more locations (or at different points in time at the same location if one desires to measure inflation). For the overseas COLA, the cost of a CONUS market basket is priced at CONUS and OCONUS prices.

An alternative to a Laspeyres index is a "Paasche" index wherein an OCONUS market basket would be priced at CONUS and OCONUS prices. That is, one would analyze the expenditure patterns of OCONUS members to determine the market basket, instead of the current practice to analyze the expenditure patterns of CONUS members to determine the market basket.

Technically, the Laspeyres index will overstate the cost of achieving the same level of "satisfaction" from purchases in OCONUS relative to purchases in CONUS. The Paasche index, on the other hand, will understate the cost of achieving the same level of "satisfaction" from purchases in OCONUS relative to purchases in CONUS. Thus, the choice of a Laspeyres index is to the advantage of the member.

In practice, the overseas COLA index is a hybrid of the Laspeyres and Paasche indices. As described in *Section 2*, two related sets of weights are used—item weights to determine the proportion of income spent on each item within a category of goods and services, and category weights to

determine each category's share of total household expenditures for items covered under the COLA. The item and category weights are determined by the expenditure patterns of military members in CONUS. The item and category weights are, however, adjusted at some OCONUS locations. At some OCONUS locations (e.g., remote locations), not all the items in the market basket are available. When incomplete price surveys are received from a location, the items for which there are prices are re-weighted. In addition, category weights are sometimes adjusted to capture "environmental" differences. For example, in locations with extremely warm climates the category weights for the food categories are increased to account for greater spoilage of food in warm climates. Similarly, in areas with extremely cold climates the category weight for clothing is increased. In areas where certain category weights are increased, the other category weights are decreased so that the weights always add to 100 percent.

The implications of using a pure Laspeyres index (i.e., CONUS weights only) are that "environmental" adjustments are not considered. Consequently, at some locations the COLA would decline. The implications for the services are shown below, although the effect to the members would vary substantially by location. The total cost of the overseas COLA would decline by $32 million across all Uniformed Services, while the average COLA of the member would decline by $144 per year. The per member decline in COLA would be greater for members of the Coast Guard (-$477), and least for the Marine Corps (-$91). This variation in the COLA adjustment across services reflects where members of the various services are located. Appendix C contains a brief description of the model used to estimate these cost estimates.

Table 6. Implications of Using a Pure Laspeyres Index

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	-5.11	-10.16	-12.92	-2.08	-1.73	-0.00	NA	-32.00
Additional Annual Cost per Member ($)	-62	-201	-207	-9	-477	-269	NA	-144

We conclude from this that the differences between a pure Laspeyres index and the "hybrid" are not large, and that the differences that do exist reflect adjustments that benefit the member.

4.1.2 Government Facility/Local Economy Expenditure Share

Members at most overseas locations have access to a Commissary and Exchange located at the installation or at a nearby installation. Prices from the commissary and exchange enter the location's index weighted by the proportion of expenditures estimated to be incurred by the member at the commissary and exchange. Typically, commissary and exchange prices are lower than prices in the local economy. Hence, it is usually the case that the COLA index and COLA payments decline when a higher proportion of expenditures are estimated to occur at the commissary and exchange.

Currently, estimates of the proportion of expenditures in the commissary and exchange are derived from members' actual expenditures as recorded by members in the triennial Living Pattern Survey. There are two problems with the current procedure. The first is that estimating expenditure proportions from a survey places a burden on the integrity of the system by potentially pitting the members' narrow economic interests in conflict to an honest response. It is undoubtedly the case that most members respond to the survey honestly, and to the best of their knowledge and ability. Nevertheless, it constitutes a poor design feature of the current system.

Moreover, the LPS itself is costly to administer and is subject to challenge based on sample size, representativeness within population sampled, and content. (Sampling issues are discussed in a later section). A major benefit of administering the LPS to members, however, is that it does link members with the process for determining the allowance, thus encouraging "buy-in."

The second problem is the use of actual expenditures to determine the proportions. Basing the proportions on actual expenditures appears, on the surface, quite reasonable. However, it leads to some perverse results. For example, a sort of "death spiral" may occur in which high prices in the local economy drive members to do more of their shopping in the commissary and exchange, which in turn reduces their COLA payment and income, resulting in further increases in the proportion of shopping at the commissary and exchange. Thus, members are doubly burdened—once by the effect of external forces that adversely affect their shopping patterns, and again by the effect of changing shopping patterns on the COLA amount. If the price of goods and services in the local economy

rise relative to the prices at the commissary/exchange, shoppers will purchase more goods and services on base—even if there is less selection. Consequently, in the short run, the increase in local prices will be reflected in the COLA amount. In the long run, one may observe the perverse result that as prices in the local economy rise, the COLA declines because the member does more shopping in the commissary and exchange.

The potential for perverse results which most observers would consider an inequitable and undesirable feature of the system can be seen even more clearly in the comparison of two similar installations. Consider an actual case in Alaska. Elmendorf Air Force Base, a few miles outside of Anchorage, has a very nice commissary and exchange. Eielson Air Force Base, about 400 miles to the north, is about 25 miles outside of Fairbanks. Its commissary and exchange is similar to Elmendorf's, though perhaps smaller and somewhat less well-stocked. Members and their families at Elmendorf do a significant portion of their shopping in the local economy at Anchorage, even though prices are higher than the commissary or the exchange. Prices are higher in Fairbanks, and variety is less, compared to Anchorage. Moreover, the roundtrip distance from Eielson, 50 miles, is a significant impediment to shopping in the winter. Consequently, members at Eielson do a smaller proportion of their shopping in Fairbanks. Consider the following:

- Members at Elmendorf and Eielson have roughly equivalent commissary and exchange facilities, (or, arguably, Elmendorf's may actually be better).

- Members at Elmendorf have better shopping opportunities in the local economy, and face lower prices in the economy, than do members at Eielson. In a sense, before COLA, they are better off economically than those at Eielson.

- Elmendorf members have a higher COLA reflecting the greater proportion of shopping they do in the local economy compared to members at Eielson.

The same factors that drive Elmendorf to higher expenditure proportions in the local economy of Anchorage compared to Eielson and Fairbanks are also undoubtedly at work elsewhere. Most particularly, the proportion of expenditure in the local economy for members stationed in the continental United States is greater than the proportion in the typical overseas location. Because prices in the U.S. economy are typically higher than prices in the commissary and exchange, and because the CONUS price index forms the denominator of all of the OCONUS COLA indices, this affects all COLA payments.

In addition to the case studies and anecdotal evidence of this effect, we conducted regression analysis that suggests that:[25]

- Commissary/exchange shopping proportions are higher, the greater is the selection in the commissary and exchange;

- Commissary/exchange proportions are lower for those who must travel to visit the commissary and exchange;

- Commissary/exchange proportions are higher, the higher are the prices in the local economy. In particular, we find that a 10% increase in the prices in the local economy increases the commissary/exchange expenditure proportions by 6%.

An alternative to using actual expenditures to determine the proportion of items purchased on base is to create a normative standard for government facility/local economy expenditure share. This normative standard would be similar in concept to the standard adopted in the basic allowance for housing (BAH), where standard housing is defined. It would simplify the process and reduce the concern among members of the "death spiral" issue.

One specific alternative is to apply the commissary and exchange expenditure proportion observed for members in the continental United States to all OCONUS locations. There are two reasons for this. First, one can consider the opportunity to shop in the local economy as well as at the installation as part of the member's standard of living. That is, arguably, CONUS shopping patterns are themselves part of CONUS standard of living or quality of life. Second, members in the continental United States purchase a higher proportion of their goods and services in the local economy (i.e., the U.S. economy) than do members at the typical OCONUS location. Because prices in the United States economy are typically higher than prices in the commissary and exchange, this means that the CONUS portion of the COLA index is higher than it otherwise would be. This forms the denominator of the OCONUS COLA indices at all the locations outside of the United States. Hence, the OCONUS COLA indices and the COLA payments themselves are lower than they otherwise would be.

Using CONUS commissary/exchange proportions results in a substantial increase in COLA on average (***Table 7***). The COLA is lower at seven locations in our model, though, such as Paris and London. The approximately 8,245 members who live at these seven locations would see their COLA decline, on average, by $783 per year. Alternatively, one

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[25] The details of this analysis are in ***Appendix A***.

could use a weighted average of CONUS commissary/exchange proportion and the OCONUS commissary/exchange proportion (**Table 8**). In this scenario, the COLA would decline by $196 per year, on average, for the 8,245 members at the seven locations.

Table 7. **Implications of Using CONUS Commissary/Exchange Proportions**

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	165.18	70.26	142.14	39.37	1.55	0.02	NA	418.52
Additional Annual Benefit per Member ($)	2,009	1,389	2,278	1,722	426	1,701	NA	1,884

Table 8. **Implications of Using Weighted Average of 75% OCONUS Proportion and 25% CONUS Proportion**

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	41.92	17.59	37.97	10.12	0.60	0.01	NA	108.21
Additional Annual Benefit per Member ($)	510	347	608	442	166	431	NA	487

A second option is to use the minimum of (1) the actual proportion of expenditures on base, and (2) the CONUS-determined proportion of shopping on base. The purpose of this option is to ensure that members with unattractive local shopping opportunities are not further disadvantaged by a lower COLA.

A third option is to vary the proportion by the class of commissaries and exchanges. This option could use a multivariate regression analysis to determine the government facility/local economy expenditure share as a function of the characteristics of the on-base facilities and location of members. Then, the expenditure share would be set for a particular location based on the regression results. This is approximately equivalent

to setting the expenditure share at a specific OCONUS location to be the average expenditure share at all similar locations.

To model CONUS conditions under this third option, we predict the proportion of members' spending at the commissary/exchange using the regression described previously and setting the local index to 100.[26] When we do this, the proportion of members' spending at the commissary/exchange falls from 40.5 to 28.6 percent, on average. This, in turn, increases the cost-of-living index values for most locations and the average COLA rises. At some locations (e.g., Alaska and Puerto Rico) the COLA actually falls. The Coast Guard, which has a large portion of its OCONUS members in Alaska and Puerto Rico, experiences a decline in COLA amounts, on average. Under this scenario, the COLA would increase for most members but would fall, by an average of $846 per year, for approximately 43,252 members at 16 locations in our model.

Table 9.   Implications of Using Commissary/Exchange Proportions Based on a Regression Model

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	58.87	32.66	79.19	30.95	-2.17	0.01	NA	199.51
Additional Annual Benefit per Member ($)	716	645	1,269	1,353	-597	450	NA	898

A fourth option is simply to set proportions as a matter of policy. That is, commissary and exchanges are provided to members and their families at OCONUS locations. As a matter of policy, it would be assumed that x% of expenditures would be at the commissary/exchange, and the OCONUS COLA would be computed appropriately. Basing expenditure proportions on policy, rather than on actual expenditures, is similar to practices used by the State Department and the World Bank to determine the proportion of spending that employees will make in-country (i.e., at the overseas location) versus out-of-country.

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[26] The regression analysis is described in more detail in *Appendix A.*

4.1.3 CONUS/OCONUS Expenditure Share

The State Department and the World Bank both assume a fixed percentage of spending will occur outside the overseas location and thus will not be affected by exchange rate fluctuations. When the State Department adjusts the COLA for exchange rate fluctuations, it assumes that 15 percentage points in the cost-of-living index will not be affected by exchange rate fluctuations. The estimate used by the World Bank is 20 percentage points in the cost-of-living index.

A benefit of assuming that a fixed percentage of spending occurs in the U.S. is simplification of the data collection process. In addition, the criticism of using actual expenditures to estimate commissary/exchange proportions also applies here.

4.1.4 Exchange Rate Adjustment System

As described in *Section 2*, under the current system exchange rates are assessed bi-weekly to determine whether the market exchange rate has deviated sufficiently from the exchange rate actually used to determine the current COLA to warrant a COLA adjustment. If the cumulative difference between the daily market exchange rate and the exchange rate being used to calculate the current COLA exceeds 5%, then a COLA adjustment is made. Previously, a 10% threshold was used.

The purpose of the current system of exchange rate adjustment is to balance the costs of frequent exchange rate adjustments with the potential cost to the member if the COLA does not reflect current exchange rates. In most countries, because the exchange rates are fairly stable, COLA adjustments are infrequent. At times, though, economic conditions can cause rapid and significant changes in a country's exchange rate which necessitates a mechanism for rapid and accurate COLA adjustments. The COLA adjustment mechanism should minimize differences between market exchange rates and the exchange rate used to determine COLA amounts.

Movements in freely floating exchange rates approximate a "random walk" or fair game, where the best predictor of tomorrow's rate is today's. Because PDTATAC uses a cumulative threshold to determine whether changes in the exchange rate warrant a COLA adjustment, the U.S. dollar may appreciate (relative to the foreign currency) for a period of time and then depreciate without causing a COLA adjustment. Although members are not disadvantaged under the current system, on average, the member is advantaged (disadvantaged) during times when the market exchange rate

is above (below) the rate used in the COLA calculation—i.e., when the dollar has appreciated (depreciated).

As part of this review, we investigated whether members are disadvantaged by the current system of exchange rate adjustment. To do this, we analyzed COLA payments using three different thresholds before a COLA adjustment would take place—i.e., a 10%, 5%, and 1% cumulative threshold. The simulation used data from calendar year 1999 for five countries—Germany, Italy, Japan, Singapore, and the United Kingdom.

Our analysis indicates that under the old threshold (i.e., 10% cumulative difference in exchange rates), in 4 of 5 countries considered the member was slightly advantaged by exchange rate changes over the period. In Germany, UK, Singapore and Italy, the member gained between 0 and 1.5% of COLA over the period. In Japan, however, members lost about 1% of COLA because the exchange rate used in the COLA calculation lagged behind the market exchange rate.

The new cumulative threshold (i.e., 5%) increased the frequency of adjustment for each country from about 8 to about 13, on average. The lower cumulative threshold results, on average, in smaller deviations between the actual COLA and what the COLA would be if it were continuously adjusted for change in exchange rates. A 1% threshold dramatically increased the frequency of COLA adjustments to about 90% of bi-weekly pay periods.

The new exchange rate threshold of 5% is a reasonable compromise between frequency of exchange rate adjustment and the potential cost to the member. However, we recommend that PDTATAC continue to explore the advantages of continuous (bi-weekly) adjustments for exchange rate changes. Given advances in computer technology, it is unlikely that the costs of continual adjustment will outweigh the benefits.

4.1.5 Miscellaneous Category

The "Miscellaneous" category in the market basket contains a mixture of items that do not logically fit into one of the 13 other categories. This category accounts for almost 10% of the total cost-of-living index weight. The prices for this entire category are set equal to CONUS prices for all locations, which biases the index toward "no difference" in cost of living. Ideally, one should compute actual price differences for these items.

One major item in the "Miscellaneous" category is the cost of owning an automobile. The purchase price of an automobile can vary substantially by OCONUS location, and is often substantially higher in OCONUS than

in CONUS. The current reasoning, that automobile purchase costs are the same regardless of location, is questionable. The argument is that though one may pay more for a car at the OCONUS location, one can also sell it for more before returning to CONUS, so the net cost of owning an automobile is the same regardless of location. However, automobile depreciation costs and interest related costs from purchasing a vehicle will vary with the price of a vehicle, and thus by location.

We recommend that actual prices be collected for the Miscellaneous category. In the interim, we recommend that prices in the Miscellaneous category at OCONUS locations be presumed to bear the same relationship to CONUS prices in that category as the expenditure-weighted average of the prices across the categories that are collected for that location bear. That is, if the average of prices in all other categories were 10% above CONUS prices, for example, it should be presumed that the local prices for items in the Miscellaneous category should also be 10% above CONUS prices, rather than equal to CONUS prices, as is now the case. In essence, this option would be equivalent to omitting the items from the index. The table below (Table 10) provides an estimate of the budget implications under the assumption that the Miscellaneous category prices will bear the same relationship to CONUS prices as do prices in other categories.

Table 10. Implications of the Miscellaneous Category Analysis

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	26.18	18.96	24.35	8.04	1.11	0.00	NA	78.64
Additional Annual Benefit per Member ($)	318	375	390	351	305	308	NA	354

Although the COLA may increase at many locations if price data were collected for items in the Miscellaneous category, the COLA may fall at some locations. We recommend that PDTATAC study the implications of formally pricing the Miscellaneous category prior to a final decision to implement.

4.1.6 Market Basket Items

The market basket items were determined, in part, by the Interagency Allowance Committee—a committee whose participants represent every federal agency with civilian personnel assigned overseas. The market basked contains a subset of the items collected in CONUS by the BLS. Three criteria used to select items for the market basked are (1) the items are representative of those goods and services purchased by members, (2) the items are available overseas, and (3) the items are good indicators of price changes overseas. An important question is whether there are important items that are excluded from the market basket, or included inappropriately.

4.1.6.1 Trip Home and Long Distance Call Service

Some items in the CONUS market basket are "inputs" to producing intrinsically valuable goods and services. We consider two: (1) travel to visit relatives/friends out of town, and (2) long distance calls to talk to relatives/friends who live in another town. Costs for these "goods and services" are not accurately captured in CONUS market basket, so price differences are not captured in the COLA.

Because the market basket prices items in per unit costs (e.g., the price for a gallon of gasoline), difference in the cost of a "travel mile" is, arguably, captured. If the good itself is the "visit", not the "travel mile", then the market basket does not capture the cost of the greater distance for an OCONUS visit to CONUS friends/relatives. A similar argument can be made for long distance phone service.

Most private sector firms and the World Bank provide an annual trip to the U.S. for expatriates and family members. Members of the Uniformed Services may have access to Military Airlift Command (MAC) flights at low cost on a "stand-by" status, depending on where they are assigned. Inherent uncertainty in "stand-by" status increases expected travel time and variance in travel time. Problems increase with family size (i.e., number of passengers). Furthermore, access to MAC flights may be extremely limited in some locations. Moreover, the member is often left to his or her own devices from the CONUS air force base to his or her final CONUS destination. These limitations make MAC flights a less than adequate substitute for funded commercial travel.

Below we consider the budget implications of adding two items to the COLA: (1) one trip for each member and up to four dependents over a three year OCONUS tour (*Table 11*), and (2) 30 minutes of long distance time per month from the OCONUS location to a central CONUS location

(**Table 12**). Providing a trip home would, however, require legislative changes and may not necessarily be part of the COLA.

Table 11. Implications of Paying For a Trip Home Per Tour

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	55.7	44.09	49.82	15.21	1.97	0.01	0.41	167.20
Additional Annual Benefit per Member ($)	677	872	798	665	544	454	980	753

Table 12. Implications of Paying For 30 Minutes Per Month, Long Distance

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	3.54	2.59	2.89	1.18	0.14	0.00	0.02	10.36
Additional Annual Benefit per Member ($)	43	51	46	51	37	36	36	46

4.1.6.2 Dependents' School Expenditures

At most OCONUS locations, primary and secondary education for members' dependents is provided in-kind by DoDDS. DoDDS will fund enrollment in non-DoDDS schools, however, if DoDDS schools are unavailable or inadequate at a location. DoDDS attempts to provide an education that is the equivalent of U.S. public school. DoDDS will fund tuition, fees, books and transportation up to the Department of State standard allowance for the location.

A concern some members have is that some educational expenses are not fully covered in either the COLA or DoDDS funding. For example, some non-DoDDS schools may require students to participate in overnight

school-related travel. Under the current DoDDS polices, much of the cost of overnight travel is not covered by the DoDDS system.

We do not believe that dependent school expenditures should become part of the OCONUS COLA payment under the current institutional framework, for two reasons. First, expenditures that can be directly linked to dependent education-related factors should be the concern of the relevant program for dependent education. Second, reimbursement through DoDDS is more efficient because it would allow the Uniformed Services to more easily reimburse only those members who actually incur the expenses. Reimbursement through the COLA, which is paid to all members at the location regardless of whether a particular expenditure is actually incurred, would under-reimburse members who incur the expenses and over-compensate members who do not incur the expenses.

4.1.6.3 Spouse Employment

Strictly speaking, the effect of a member's overseas assignment on spouse earnings is not a cost of living issue. It would be a significant extension of the concept of the market basket of goods and services to include spouse earnings opportunities. Nevertheless, one of the most difficult problems in the overseas assignment of members is the effect that an accompanied overseas tour may have on the employment opportunities of the member's spouse. If the spouse had been working in the United States, it is likely that the transition to the overseas location will result in some lost spouse income in most cases.[27]

In most cases, the lost spouse income will be substantial. There are several reasons for this. First, the primary source of jobs for spouses at overseas locations is the installation itself. Jobs as federal civilians are limited and difficult to obtain. Jobs through non-appropriated fund sources, such as AFFES, DECA and morale, welfare and recreational activities (MWR), are somewhat more plentiful, but the positions are limited both in starting salary and advancement opportunities. Second, employment in the local economy is difficult and may not be possible in some instances. Language and customs barriers may limit immediate opportunities. More importantly, legal restrictions on non-citizen employment and restrictions codified in Status of Forces (SOF) agreements may make working in the local economy impossible at some overseas locations, and very difficult at others.

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[27] A possible exception to this is the case in which the spouse works as a civilian employee of the member's Service, and is able to arrange a transfer to the overseas location at the same civilian grade.

In the private sector, it is rare for a multinational firm to compensate fully for a spouse's lost earnings due to the assignment of the employee. That is, they do not typically pay 100% of the spouse's salary prior to the assignment for the entire duration of the employee's assignment. Typically, however, they may provide "transition assistance" which may be about one to three months of the spouse's earnings. In principle, this provides funds for training and placement services, and lost earnings over a modest transition period. In practice, it provides a sum that is, in most cases, only partial compensation for lost earnings. Because overseas assignment in the private sector is largely voluntary, compared to the military where overseas assignment is largely involuntary, lost spousal income for employees of private sector firms is largely internalized. That is, private sector employees who will suffer financially from lost spousal income will be less likely to volunteer for overseas assignment.

The effect of a member's overseas assignment on spouse earnings opportunities is a particularly difficult issue for the Uniformed Services to address. Any significant program in this area would be costly. We offer three points for consideration.

First, the Services could offer "spouse transition assistance" in the form of one or two months of the member's basic pay. This would be analogous to a practice frequently found frequently in the private sector. We suggest, however, that the payment be a function of the member's basic pay, to make administration tractable. Such a program would have two shortcomings. It would be quite costly, even if only one month's of basic pay were offered. In addition, if it were offered only to members with spouses, which after all seems reasonable for a "spouse transition assistance", it would be yet another benefit that favors the married member relative to the unmarried member.

Second, the Services might consider permitting the member's spouse to use the member's tuition assistance program (TAP) benefit, or a portion of the benefit, for the period of time that the member is on an accompanied tour outside of CONUS. Along with eligibility for the benefit, the spouse would also have full access to overseas opportunities for higher education programs that are provided to members. As we have suggested, the spouse may not have the opportunities for using human capital in the job market while overseas. The tuition assistance entitlement would provide an opportunity for increasing human capital.

Third, the Services could place a greater emphasis on a voluntary assignment system. As discussed in *Section 6*, this would help to reduce the most difficult spouse employment issues by permitting those members for whom an assignment is particularly costly to the household, because of

spouse employment, to choose an assignment which would not adversely affect the spouse's employment opportunities.

4.2 DATA COLLECTION _____

The collection of price data and information on members' spending patterns is resource intensive. In this section we discuss alternatives to the current data collection methods (e.g., outsourcing). In addition, we consider three data collection issues: administering the Living Pattern Survey, seasonality in prices, and using inflation indices to update the overseas cost-of-living indices

4.2.1 Outsourcing For Cost-of-Living Data

Outsourcing for cost-of-living data is a common practice of most international private companies. Furthermore, outsourcing for cost-of-living data is currently being used by OPM, and by DoD to calculate the CONUS COLA.

One rationale for outsourcing the data collection effort is to reduce the burden placed on in-house staff overseas who currently collect price data as collateral duty. Also, data collected by a third party may be seen as being more objective. Reducing member participation in the COLA determination process, however, could in turn reduce member "buy in." As discussed above, OPM has increased member participation in the COLA determination process in recent years as a result of litigation efforts by affected members.

No analyses were performed to estimate the cost of purchasing cost-of-living data from these suppliers. Outsourcing data collection is not likely to reduce budget costs because most price collection is done as collateral duty. Also, at many of the locations the State Department already is collecting price data which it shares with DoD at no additional cost to DoD. Moreover, DoD would still have some data collection responsibilities—such as collecting data from commissaries/exchanges and collecting data at locations not covered by the contractor. Another related issue is the cost of adjusting to a new index. A contractor would most probably be required to modify its indices to reach index levels similar to those now in place. *Figure 2* shows a comparison of current private sector index values to current indices for the Uniformed Services. While the indices are broadly similar, some effort would be required to ensure that privately collected data would maintain continuity with the goals, basket, and spending patterns of the current program.

Figure 2. Comparison of Private Sector Index Values [28]
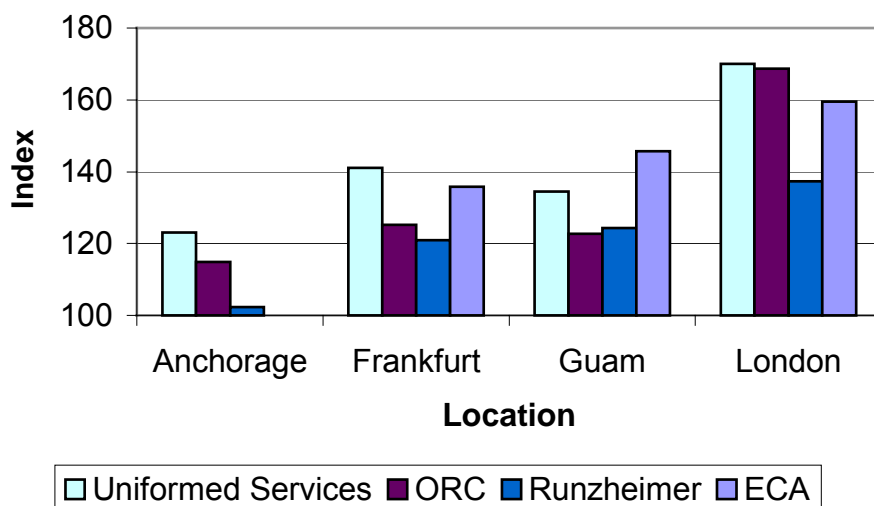
To determine how many military members are assigned to OCONUS locations where cost-of-living data currently is being collected by private suppliers, we obtained lists of cities where private suppliers currently collect data. These were matched to a list of 478 OCONUS locations where DoD paid overseas COLAs in FY 1999.[29]

We obtained information from three of the six largest companies regarding the overseas locations for which they provide cost-of-living information suppliers (i.e., AIR, ORC, and ECA). One or more of these three suppliers collects data on cost of living at 329 DoD locations. Nearly 180,000 members are assigned to these "covered" locations, which is approximately 69 percent of members assigned to OCONUS locations in FY 99 (see **Table 13**). These estimates may under-represent coverage

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[28] It is difficult to obtain data from the different sources that reflect prices in precisely the same month. These price data are all from 1999, but the months vary. This may explain some of the disparity across indices. Note also that the indices are ratio of the OCONUS location market basket cost to an estimate of the CONUS market basket cost. Also, the Uniformed Services indices are computed using data solely from the local economy and the CONUS economy, to be consistent with the private indices.

[29] The number of OCONUS locations on this list (478) differs from the number of locations listed on the Per Diem website (800) and presented earlier. This discrepancy, however, reflects differences in how locations are counted. In some cases, several locations from the 800 number are combined into one location on the list of 478 locations.

because we only counted a DoD location as "covered" if we were reasonably confident that the DoD location was the same as (or in close proximity to) the location listed by AIR, ORC, or ECA as an area where they collect cost of living data.

Currently, DoD and the State Department share responsibility for collecting cost of living data. The 329 locations where either AIR, ORC or ECA provides cost of living data covers 96% of OCONUS locations where DoD shares data collection with the U.S. State Department, and covers 50% of OCONUS locations where DoD has primary responsibility for collecting data.

Table 13.   Number of Members at OCONUS Locations Where Private Sector Companies Collect Data on Cost of Living

Company	Coverage		
	DoD Locations	DoD Members	Percent of DoD Members
AIR Inc.	230	146,347	56%
ORC	307	171,101	66%
ECA	273	136,394	52%
AIR, ORC, or ECA	329	179,890	69%

4.2.2 Using Inflation Indices To Update Cost-of-Living Indices

Under the current system for determining OCONUS COLA, prices are updated annually for each location, and occasionally at more frequent intervals, if the command requests an out-of-cycle survey. While the price survey system results in accurate prices for the COLA market basket, it requires significant investments of time and effort. Another potential problem is that it is difficult to respond quickly to sudden price shifts at OCONUS locations under the current system.

Although out-of-cycle surveys may be initiated to deal with the latter problem, they too require significant investments of time and money to be completed. Moreover, in an unstable economic environment, prices may continue to shift significantly during the course of implementing the out-of-cycle changes, thereby making the survey results less useful. Because of these factors, it may be useful to utilize some form of consumer pricing index for OCONUS locations.

A consumer price index for OCONUS locations could be a useful addition to the standard price collection scheme because it would allow the COLA to be quickly supplemented, without a costly price survey, at

times of rapid price increases in local economies. With a consumer price index that is measured frequently, on a monthly or quarterly basis for example, the negative effects of rapid consumer price inflation may be alleviated.

It may also be possible to use a consumer price index to reduce the frequency of OCONUS location price surveys. As discussed previously, the costs of conducting annual surveys at OCONUS locations can be significant in terms of the opportunity costs of the staff that conduct the surveys. One alternative may be to survey prices less frequently at each location, and instead make interim changes based on common indicators of consumer prices.

Although there are several potential benefits to using consumer price indices to update OCONUS location prices, there are also significant difficulties that must be resolved. Most importantly, such indices must be accurate and consistent in measuring price increases. The market basket used by each country to compute an inflation index may be different, so the inflation indices might not be directly comparable across countries.

4.2.3 CONUS Prices and Price Index

Prices collected to represent the cost of living in the continental United States are, arguably, the single most important set of price data collected in that they affect the COLA of every OCONUS location. The estimated CONUS cost of the specified market basket of goods and services forms the denominator of the COLA index for each OCONUS location.

Currently, CONUS price data is collected from a variety of sources, including the Bureau of Labor Statistics. However, the single largest source of price data for the private U.S. economy is data reported by the commissary and exchange services themselves. DECA and AAFES report prices for the U.S. economy based on price sampling they undertake to determine the price savings that their goods and services provide to military members in the continental United States.

There are two potential difficulties with relying on the commissary and exchange services as a major source of price information for the U.S. economy. First, there is an apparent conflict of interest. It is in the interest of the commissary and exchange services to show that the prices at which they supply goods and services to the member result in significant savings relative to prices prevailing in the economy. Hence, they are not likely to underestimate private sector prices. Second, there is an additional potential problem in the way the items are chosen for price sampling. Commissaries and exchanges typically choose particular items for sampling that are high

volume items at their respective outlets. While reasonable on the surface, one of the factors that may make a particular item a high volume item relative to another similar item is that its price is particularly attractive relative to the private sector price for that item.[30] Hence, a procedure which potentially biases the price comparison is employed for selecting items to sample.

It is an empirical question of whether the prices estimated by DECA and AAFES do, in fact, overstate private sector prices on average. To test this proposition, we obtained price data collected by Runzheimer International as part of the CONUS COLA program to compare to the price data supplied by DECA and AAFES. As discussed previously, prices collected by Runzheimer are used to calculate the CONUS COLA, while prices supplied by DECA and AAFES are used to calculate the OCONUS COLA. The DECA/AAFES price data are not the prices of items at the commissary/exchange. Rather, they are estimates of prices at stores in the local economy where members shop.

The Runzheimer prices reflect the average prices for items in the CONUS COLA market basket, as of September 1999, for the "standard" city in the continental U.S. The prices supplied by DECA and AAFES reflect the average CONUS prices as of July 1999. Hence, other things being equal, we would anticipate that the Runzheimer prices should be slightly greater than the commissary/exchange prices, because they reflect prices about three months later.

We compared prices of only those 62 items in the OCONUS COLA market basket that typically would be found at either a commissary or exchange. Not all items in the OCONUS COLA market basket are in the CONUS COLA market basket, but we were able to identify 49 items (79%) that both market baskets had in common. Thirteen items could not be matched across the two market baskets. For example, the CONUS COLA market basket includes butter, while the OCONUS COLA market basket includes margarine. Furthermore, the CONUS COLA market basket includes whole wheat bread, while the OCONUS COLA market basket includes white bread.

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[30] Consider a hypothetical example. Assume that the commissary stocks both Cocoa Puffs and Wheat Chex. Its price for Wheat Chex is about 20% below the private economy's price, but the price for Cocoa Puffs is about the same. Consequently, military members who like Wheat Chex stock up when shopping in the commissary, but members who like Cocoa Puffs do not. Because Wheat Chex is the high volume cereal for the commissary, it samples its price in the private sector, but not the price of Cocoa Puffs.

We computed an index that shows the ratio of the DECA/AAFES-determined prices to the Runzheimer prices. The index for each category of market basket items reflects the ratio of DECA/AAFES prices to Runzheimer prices, weighted by the item weights in the OCONUS COLA market basket. For the 13 items where no Runzheimer prices were available, we assumed a price ratio of 1.

The index value of 1.04 for the meat and dairy category indicates that CONUS average prices as determined by DECA/AAFES are four percent higher than average prices as determined by Runzheimer (**Table 14**). DECA/AAFES-determined prices are substantially lower than Runzheimer prices for clothing and fruits and vegetables. Using the OCONUS COLA category weights to combine the indices for each category, we calculated that the DECA/AAFES-determined prices for all items typically purchased at a commissary or exchange are 9 percent lower than the Runzheimer prices.

Table 14.   Comparison of DECA/AAFES-Determined Prices at Local Outlets to Runzheimer Data

	Meat/ Dairy	Groceries	Fruits/ Vegetables	Personal Care	Tobacco/ Alcohol	Furnishing/ Household	Clothing	Total
Ratio of DoD to Runzheimer prices	1.04	0.94	0.80	0.89	1.04	0.96	0.71	0.91

Hence, accepting the Runzheimer data as a valid comparative measure, we find no support for our hypothesis that the price data from DECA and AAFES overestimates prices in the local economy. The difference in prices may, however, reflect an imperfect matching of items in the OCONUS COLA and Runzheimer market baskets. That is, the quality of items in the Runzheimer market basket may be different than the quality of items in the OCONUS COLA market basket despite our attempt to compare prices of comparable items.

Based on our analysis, we can not state that the price data collected by DECA and AAFES systematically overstate the true prices in the continental U.S., as we conjectured. However, because the prices estimated for the continental U.S. affect the COLA of all locations, we recommended that the prices be periodically validated through independent random sampling of U.S. prices, and through comparisons with alternative price measures, such as the Runzheimer data.

4.2.4 Living Pattern Survey

The LPS is administered to a sample of members at each OCONUS location approximately every three years. The purpose of the survey is to obtain information on (1) the proportion of spending for each item in the market basket at the commissary or exchange, at the local economy, through the mail, or from CONUS; and (2) the stores in the local economy at which the members and their dependents shop.

Under the current system, DoD administers the LPS to approximately 150 members at each location. The number of members actually sampled is typically somewhat greater at larger installations and somewhat fewer at smaller installations. At locations with a small number of members, all members are asked to participate in the survey.

Shopping and expenditure patterns will generally vary by member. To obtain statistically valid answers—answers that represent the overall population means – the LPS should be administered to a random (or a "stratified" random) sample of members. Moreover, the sample should be of sufficient size so that the sampling variation that occurs is within acceptable bounds.[31]

The sample size should be determined based on the number of members (N) at the location, the desired confidence interval, the desired level of precision at the confidence interval, and the proportion of spending on items at the commissary or exchange. A formula to estimate sample size from a finite population is:

$$n = \frac{NZ^2 p(1-p)}{e^2(N-1) + Z^2 p(1-p)}$$

where "n" is sample size, Z is related to the desired level of confidence (or the probability that the estimate will be within a given range of the true population value), e is the level of precision or the desired length (range) of the confidence interval, and "p" is the underlying proportion.

To illustrate how these factors affect the desired sample size, consider the following two examples. *Figure 3* shows how the proportion of spending at the commissary and the desired level of precision in the estimated proportion of spending at the commissary affects the desired sample size. In this example, the desired confidence interval is held constant at 95 percent (i.e., Z=1.96), and the number of members at the OCONUS location is assumed to be 100 people. If members purchase

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[31] The probability that a sample mean will be within a given range of the population's true mean increases with sample size. Larger sample sizes will increase the likelihood that estimates are close to the true population values.

approximately 30% of goods and services at the commissary, then a sample size of approximately 77 members would produce an estimate of commissary usage that is within 5 percentage points of the true proportion with probability 0.95. If the level of precision is increased from 5 percentage points to 3 percentage points, then the desired sample size would increase to 90 members. *Figure 4* shows how the desired sample size changes at a location with 1,000 members.

Figure 3. Sample Size Determination (N=100, C.I.=95%)
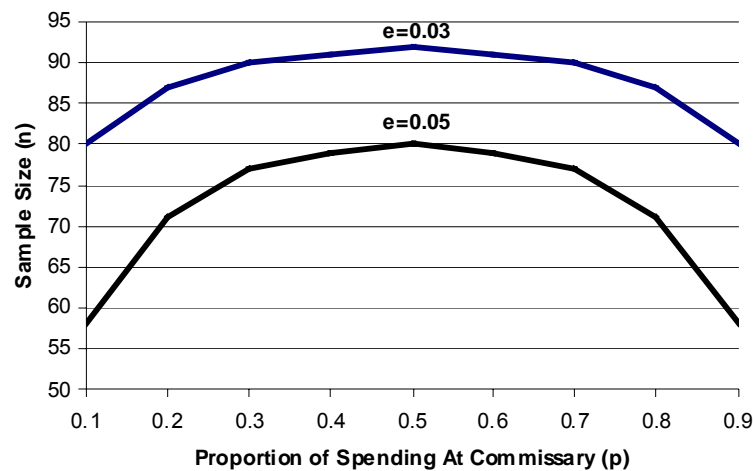
Figure 4. Sample Size Determination (N=1,000, C.I.=95%)
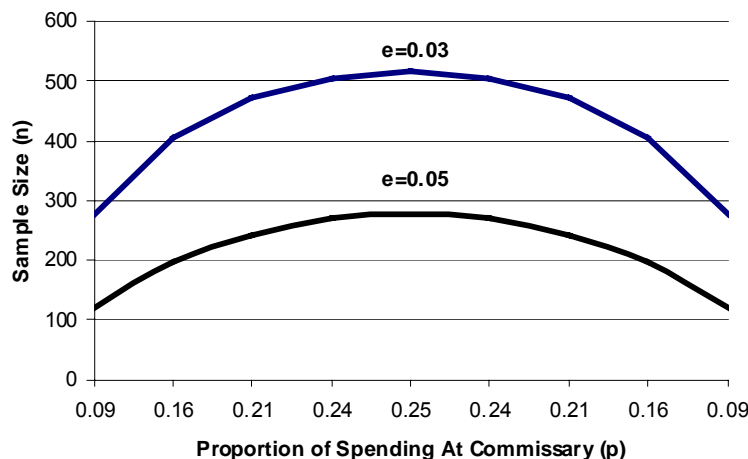
Because shopping patterns of households will differ by income level and by household size, the survey should be administered to a random sample of members, stratified by income level (or grade) and household size. For example, if 23% of the members at a location are single, enlisted grades E1 through E4, then 23% of the LPS sample should be single, enlisted grades E1 through E4. The following table reflects the distribution of OCONUS military members by grade and dependents status as of July 1999. The distributions vary substantially across OCONUS locations. If the number of members at a location is small (e.g., fewer than 50), then all members should be surveyed.

Table 15.   Distribution of OCONUS DoD Members by Grade and Dependent Status (July 1999)

Service	NO Dependents	YES Have Dependents	Total
E1-E4	23%	20%	43%
E5-E6	10%	23%	33%
E7-E9	3%	8%	11%
O1-O4, W1-W4	4%	6%	10%
O5-O10	1%	2%	3%
Total	**41%**	**59%**	**100%**

One issue in collection and application of the data is the problem of small area estimation techniques. For some locations, the sample is very small, with a potentially high variance. Statistical methods, sometimes called "small area estimation techniques" or shrinkage estimators, have been suggested in such cases. The concept is to combine the estimates at the small site with estimates from larger sites, in order to obtain an estimate with lower variance. When DoD decides to combine locations and apply a single COLA to several sites, it is, in a sense, an extreme form of this concept.

4.2.5 Seasonality in Prices

In general, OCONUS price levels are sampled once a year. That set of prices is used to adjust the COLA index used over the ensuing twelve months (i.e., it is meant to reflect the average annual difference in prices of items in the market basket). The prices of many goods and services, however, vary throughout the year. Systematic seasonal variation in price levels may result in an inaccurate, and possibly biased, COLA index.

CONUS prices are collected quarterly, while OCONUS prices are collected at different times of the year for different locations. Thus, most OCONUS price surveys should be within a month of the CONUS price surveys to which they are compared. For example, OCONUS prices collected in April will be compared to CONUS prices at the end of the first quarter (i.e., March). OCONUS prices collected in May will be compared to CONUS prices collected at the end of the second quarter (i.e., June).

Price seasonality is a problem only if the seasonal variation in prices differs between CONUS and OCONUS locations. If OCONUS and CONUS price variations are positively correlated (i.e., they move in the same direction and are of approximately the same magnitude), seasonality in prices will result in little bias in the COLA index. However, *relative* seasonality discrepancies may cause the COLA index to over- or under-state the true price difference between CONUS and the OCONUS location. This may arise if the seasonal variations in CONUS prices do not match the observed patterns in OCONUS locations.

If the relative seasonality difference is positive (meaning OCONUS price levels are relatively higher than CONUS price levels for the same time of year) the observed COLA index will be higher than the "true" annual average of the index. On the other hand, a negative relative difference means the actual COLA index will be understated. It is important to note that it is the relative difference that matters in this case.

To test for evidence of bias, we constructed seasonality indices for the United States and for other countries—including the U.K., Italy and Germany—in which there are significant numbers of OCONUS COLA recipients. We used ten years of monthly price data from Eurostat.[32] We calculated indices that measured how much price levels in a particular month of the year varied from a 12-month average price level over the ten-year period. Index values greater than 1.0 denote "expensive" months, while index values below 1.0 are associated with months in which price levels are lower than average. *Table 16* shows the monthly indices for general price levels by country.

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[32] Eurostat is the Statistical Office of the European Communities. This data is distributed by the Resource Centre for Access to Data on Europe, Department of Geography, Durham University (UK).

**Table 16. Monthly Indices, General Price Levels**

Month	Country						
	US	UK	Netherlands	Italy	France	Germany	Belgium
January	0.999	1.002	0.997	1.046	0.998	1.054	1.046
February	0.999	0.999	0.997	0.993	0.998	1.053	1.049
March	0.999	0.998	0.997	0.991	0.998	1.051	1.049
April	1.052	0.997	1.001	0.992	0.998	1.049	1.049
May	1.052	1.046	1.053	0.995	1.049	0.996	0.999
June	0.997	0.995	1.001	0.949	0.997	0.946	0.950
July	0.995	0.993	0.997	0.994	0.995	0.946	0.949
August	0.996	0.992	0.994	0.996	0.996	0.949	0.951
September	0.997	0.993	0.996	0.998	0.996	0.951	0.952
October	0.997	0.993	0.999	0.999	0.998	1.000	0.998
November	0.948	1.004	1.002	0.998	0.999	1.001	0.998
December	0.948	0.956	0.953	0.998	0.951	1.001	0.997

Seasonal variation appears to be important in some cases. For example, price levels may vary by as much as five percent above or below the annual average in a particular month in both the U.S. and some of the other countries. Moreover, the seasonal patterns are not consistent across countries. Some "high-cost" months in the U.S. (e.g., April) are "low-cost" months in other countries.

We next computed the relative monthly difference by calculating the percentage difference between each country's indices and the U.S. indices for the same month. For example, the February index for Germany is 1.053 (i.e., February prices in Germany are about five percent higher than the annual average) and the U.S. index for the same month is 0.999. Therefore, the German index for February is 5.45% higher than the U.S. index. These percentage differences are shown in *Figure 5*.

Using Italy as an example, we can construct a hypothetical scenario in which the COLA produces a biased result. If an annual price survey conducted in April at an Italian location yielded an index of 115, the COLA would likely understate the price differential with CONUS. Such an index compares April prices in Italy to CONUS prices for the same period, but does not consider the fact that April is an above average month in the U.S., but a slightly below average month in Italy. This difference, shown graphically above, is about 5.7%.

Figure 5.   Seasonality in Prices
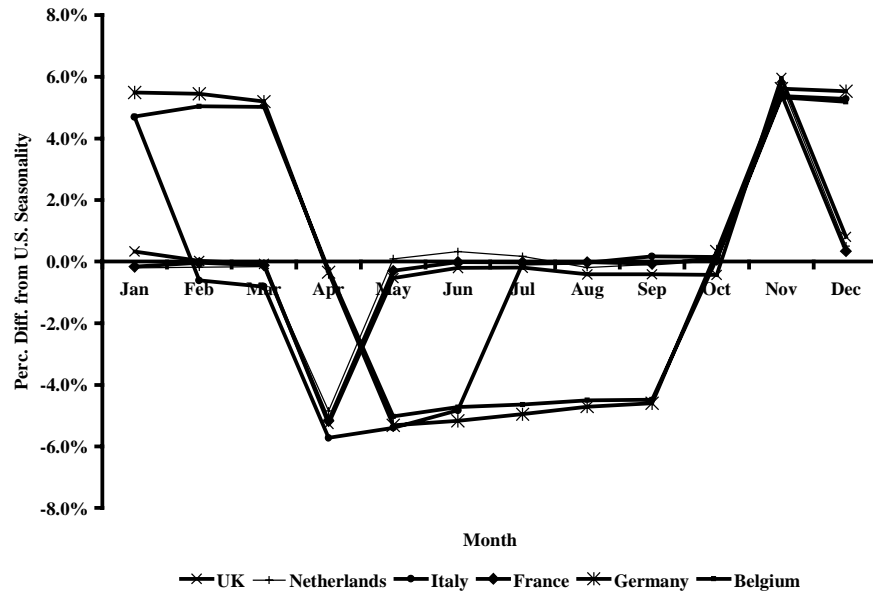
This means that the COLA index of 115 was created at a time when prices were higher than normal in the U.S., and lower than normal in Italy. The ultimate result is that the COLA is understated and an Italian-based member will be able to purchase fewer goods, on average, than his or her CONUS-based counterpart, unless seasonal fluctuations were accounted for, by increasing the index to 121 (a 5.5% increase). It is also important to note that the outcome of the index is highly dependent upon the time of year the survey is taken. As relative prices rise in Italy and fall in the U.S. during November and December, a survey taken during that time would bias the results in the opposite direction, overestimating the benefit due to Italian-based personnel.

Given some knowledge of local seasonal patterns, one might expect that commands will not choose to undertake surveys at times that bias the calculation against members at OCONUS locations. Moreover, requests can be made for out-of-cycle surveys, which could be used to adjust a COLA created from disproportionately lower OCONUS price levels.

Currently, commands have some discretion in choosing the month to undertake price surveys in OCONUS locations. Prices are collected for Germany in November of each year, with the exception of Frankfurt

(where the State Department provides price data) which collects prices in February. Local commands in the United Kingdom, Netherlands, Italy, France, and Belgium all collect price data in March. According to our data, most have selected a month in which the price index is very close to one. The exception is Belgium, for which March is a relatively high-cost month. However, the true extent of any bias depends as well on the U.S. indices for the same period. The ratio of the country's seasonal index value to the seasonal index value in the United States, for that month in which the price sampling is conducted at the overseas location, is shown in the following table. Note that a value of 1.0 indicates that the month for the survey is neutral, a value greater than 1.0 indicates it favors the member, and a value of less than 1.0 is to the member's disadvantage.[33]

Table 17. Ratio of Seasonal Indices: Overseas Country Relative to U.S.

Country	Germany	UK	Netherlands	Italy	France	Belgium
Month	November	March	March	March	March	March
Index	1.06	1.00	1.00	0.99	1.00	1.05

With the exception of Germany and Belgium, the countries shown suggest no seasonal bias. The month in which prices are sampled in both Germany and the Netherlands tends to favor the member. While these indices are sufficiently imprecise to be suggestive, rather than definitive, this analysis does suggest that seasonality in prices is a legitimate concern and may affect the measure of cost-of-living differences

An alternative to eliminate the problem of seasonal fluctuations is to gather data for annual average prices at each OCONUS location. By calculating average annual prices, the possibility of overstating or understating an index due to the time of survey would be completely eliminated. Further, it would require no additional data collection in CONUS. However, this alternative would impose significant additional costs and time requirements on local commands in order to collect the additional price data.

A second possibility is to use statistically derived seasonality indices to adjust for fluctuations. While this method would require some additional periodic price collection at OCONUS locations, it would require less data than computing average annual prices for each location

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[33] Note that price indices that were available for this analysis may not precisely match the market basket that is included in the COLA calculation and the specific seasonal patterns that are relevant may differ.

every year. This alternative assumes that the seasonal fluctuations are relatively stable over time. Also, it would require no additional CONUS sampling. However, such a method would make the COLA calculation process more complicated.

A final alternative is to use seasonally adjusted CONUS prices. This alternative will reduce (but does not eliminate) COLA differences due to seasonal fluctuations if prices in CONUS and the OCONUS location are uncorrelated, or negatively correlated. However, it will increase fluctuations if there is positive correlation in the seasonality. No additional price collection at OCONUS locations is needed in this alternative.

4.3 SPENDABLE INCOME COMPONENT _____

OCONUS COLA is calculated by applying a location index to a spendable income table. Spendable income is an estimate of the portion of total income that is used to purchase items in the COLA market basket. It excludes expenditures on housing, taxes, life insurance, gifts and savings.

The Department of State generates the spendable income table using data from the Consumer Expenditure Survey (CES). Because the number of military respondents to the CES is small, it is not possible to generate a spendable income table using only data from households with a member of the Uniformed Services. Hence, civilian households are included. The State Department model is used to estimate spendable income for all Federal government civilian and military employees assigned to OCONUS locations. The State Department model estimates spendable income as a function of total income and number of dependents, yielding a lookup table similar to the one shown in *Table 18.*

Spendable income data is derived from *Table 7050. Income before taxes: Average annual expenditures and characteristics, Consumer Expenditure Survey* (various years). This table is published periodically by the Bureau of Labor Statistics and includes data aggregated from the CES. The table includes average reported expenditures and income in eleven income ranges, from less than $5,000 through $90,000 and over.

The steps in the calculation of spendable income are as follows. State Department first calculates average spendable income (SI) for each observation:

$$SI = Average\ Annual\ Expenditures - Shelter - Utilities,\ fuels,\ and\ public\ services +$$
$$Telephone\ services - Cash\ contributions - Personal\ insurance\ and\ pensions -$$
$$Gifts\ of\ goods\ and\ services.$$

Table 18. Current Spendable Income

Income Range		Spendable Income by Number of Dependents					
Low	High	0	1	2	3	4	5
0	13,999	8,600	9,700	10,800	11,300	12,400	13,000
14,000	15,999	9,400	10,500	11,700	12,300	13,500	14,000
16,000	17,999	10,100	11,300	12,600	13,200	14,500	15,100
18,000	19,999	10,700	12,100	13,400	14,100	15,400	16,100
20,000	21,999	11,400	12,800	14,200	14,900	16,300	17,000
22,000	23,999	12,100	13,600	15,100	15,900	17,400	18,100
24,000	25,999	12,700	14,300	15,900	16,700	18,300	19,100
26,000	27,999	13,400	15,000	16,700	17,500	19,200	20,000
28,000	29,999	13,900	15,700	17,400	18,300	20,000	20,900
30,000	32,999	14,700	16,600	18,400	19,300	21,200	22,100
33,000	35,999	15,600	17,600	19,500	20,500	22,400	23,400
36,000	38,999	16,500	18,500	20,600	21,600	23,700	24,700
39,000	41,999	17,400	19,500	21,700	22,800	25,000	26,000
42,000	44,999	18,200	20,400	22,700	23,800	26,100	27,200
45,000	47,999	19,000	21,300	23,700	24,900	27,300	28,400
48,000	50,999	19,700	22,100	24,600	25,800	28,300	29,500
51,000	54,999	20,600	23,100	25,700	27,000	29,600	30,800
55,000	58,999	21,500	24,200	26,900	28,200	30,900	32,300
59,000	62,999	22,500	25,300	28,100	29,500	32,300	33,700
63,000	66,999	23,400	26,300	29,200	30,700	33,600	35,000
67,000	70,999	24,200	27,200	30,200	31,700	34,700	36,200
71,000	74,999	25,000	28,100	31,200	32,800	35,900	37,400
75,000	79,999	25,800	29,000	32,200	33,800	37,000	38,600
80,000	84,999	26,600	30,000	33,300	35,000	38,300	40,000
85,000	89,999	27,400	30,900	34,300	36,000	39,400	41,200
90,000	94,999	28,200	31,700	35,200	37,000	40,500	42,200
95,000	99,999	28,800	32,400	36,000	37,800	41,400	43,200
100,000	105,999	29,400	33,100	36,800	38,600	42,300	44,200
106,000	111,999	30,000	33,800	37,500	39,400	43,100	45,000
112,000	117,999	30,600	34,400	38,200	40,100	43,900	45,800
118,000	124,999	31,000	34,800	38,700	40,600	44,500	46,400
125,000	131,999	31,400	35,300	39,200	41,200	45,100	47,000
132,000	138,999	31,600	35,500	39,500	41,500	45,400	47,400
139,000		31,700	35,600	39,600	41,600	45,500	47,500

Spendable income is simply average annual expenditures minus those elements that are not included in the COLA basket (e.g., housing).[34] The second variable derived from this table is average income before taxes (total income, or TI). Thus, we have estimates of average total income and the amount spent on items in the COLA basket for each of eleven income categories.

Next, total income is regressed on spendable income, using an equation of the form:

$$SI_i = \beta_0 + \beta_1 TI_i + \beta_2 TI_i^2 + \varepsilon_i,$$

where the βs are regression coefficients and ε is an error term. This estimates the effect of total income on spendable income. The quadratic term allows spendable income to vary non-linearly as a function of total income. In past estimations, β_0 and β_1 were positive, and β_2 was negative. Thus, spendable income increases with total income at a decreasing rate (the proportion of total income devoted to expenditures on items in the COLA basket decreases with total income, but the absolute level of spendable income continues to increase).

The regression coefficients are used to calculate predicted spendable income for a series of income levels that represent the midpoints of the income ranges shown in **_Table 18_**. The midpoint values are inserted in the equation above on the right-hand side, yielding predicted SI levels. These predicted SI levels are assumed to represent the spendable income amounts for an employee with two dependents (family size 3). SI levels for other family sizes are derived with a constant adjustment to the family-size-3 estimate (e.g., Family Size 1 = 0.8 * Family Size 3).

To apply the Spendable Income table to military members, total income for each paygrade/dependents combination is calculated using an estimate of Regular Military Compensation (RMC), which includes Basic Pay, an average Basic Allowance for Housing (BAH), Basic Allowance for Subsistence (BAS) and the tax advantage associated with tax-free allowances. Total income range can be found in the first two columns of the table. For this range of total income, spendable income depends on the number of dependents.

4.3.1 Potential Problems with Current Method

There are three potential problems with the current method of imputing spendable income. First, spendable income estimates based on a

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[34] Note that, while utilities are subtracted, telephone costs (part of the COLA basket) are added back in.

largely non-military population may not accurately represent military members' spending patterns. Second, infrequent updates of the spendable income table may lead to "bracket creep," biasing COLA amounts downward. Third, the current method of estimating the spendable income table is inefficient in that it makes poor use of the data, possibly resulting in estimates that have higher error rates around the "true" relationship between spendable income and total income than they could have.

Because the spendable income calculation subtracts several types of spending (including savings and housing costs) from total income, the current method implicitly assumes that military members' consumption patterns do not differ significantly from the general population with regard to the excluded items. This assumption may not be valid if military personnel systematically spend a different proportion of their total incomes on non-spendable income factors than do civilians.

If military members and their families generally devote less of their total incomes to excluded items than their civilian counterparts, the spendable income table will understate the proportion of total income they spend on items in the COLA market basket. Consequently, COLA amounts will be biased downward since the COLA index would apply to a smaller proportion of their total income than is, in fact, being used as spendable income.

For example, if the average military member with an income of $30,000 and two dependents has an actual spendable income of $20,000, his or her COLA will be understated.[35] In this case, a hypothetical COLA index of 110 would pay the member $1,840 instead of $2,000, the actual amount needed to compensate him or her for the loss in purchasing power in his spendable income.

Infrequent updates of the spendable income table are another source of inaccuracy in COLA levels. The current spendable income table is based on data from the 1988 and 1989 CES. Because all data is in nominal (then-year) dollars, inflation has led over time to "bracket creep." The table will be updated as of 1 October 2000 to a table based on 1997-1998 data.

The main problem is that spendable income as a proportion of total income generally declines as total income rises (individuals at higher income levels devote more of total income to housing, savings, etc.). While one would expect this relationship to remain fairly stable over time for real income, changes in nominal income levels may have a different effect. For example, an E-5 at YOS 9 with two dependents had a military income of $21,220 in FY 1988. Using the current table, the member's

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[35] From the current table, the member's imputed spendable income is $18,400.

imputed spendable income is $14,200 (67% of total income). However, by FY 1999, an E5 at YOS 9 with two dependents earned a military income of $32,331 (a nominal pay increase of 52%). Because of inflation across this eleven-year period, however, real income did not rise as much (based on changes in the Consumer Price Index, the real increase in income is about 21%). Using the current table, the FY 1999 spendable income for the example member is $18,400, or 57% of total income. As a result, spendable income, as a percentage of total military income, has fallen by 15% for the FY 99 member. At a COLA index of 122, this represents an annual loss of $712 to the member.

This problem may be addressed using two approaches. First, the spendable income table may be updated more frequently. Second, the table could be indexed for inflation between updates. ***Tables 19 and 20***, respectively, show the cost and benefit to member recipients of indexing the old FY table to FY 1999 dollars, and of implementing the new spendable income table for FY 2000. ***Table 21*** contains estimates of the cost, and benefits to the member, of implementing the new table indexed through 1999.[36]

Table 19. Implications of Indexing the 1988-1989 Spendable Income Table to 1999 (millions of dollars)

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	30.52	22.42	27.94	9.40	1.23	0.004	NA	91.52
Additional Annual Benefit per Member ($)	371	443	447	411	338	361	NA	412

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[36] Note that the cost of implementing the new table and then updating it for inflation though 1999 is about $10 million less than the cost of updating the old (1989) table for the effects of inflation though 1999. This suggests that there has been a modest, real change in the relationship between spendable income and total income.

Table 20.   Implications of Implementing the 1994-1995 Spendable Income Table in FY 2001[37]

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	9.01	6.53	8.29	2.72	0.36	0.00	NA	26.91
Additional Annual Benefit per Member ($)	109	129	132	119	98	107	NA	121

Table 21.   Implications of Implementing the 1994-1995 Table Indexed to 1999[38]

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	19.16	13.69	15.30	5.65	0.62	0.003	NA	54.42
Additional Annual Benefit per Member ($)	233	270	245	247	170	245	NA	245

In addition to the two potential problems noted above, the current method of deriving the spendable income table is a source of concern. While we have no evidence that the tables are unreasonable, we believe that an alternative method, making better use of the available microdata, should be considered. One weakness of the current approach is the small sample size (a maximum of eleven observations) when using the aggregated data. CES data is also readily available as individual observations (one for each consumer unit). In the most recent survey, this would increase the sample size to approximately 84,000. In statistical terms, the disaggregated data increases the efficiency of the estimates, leading to smaller error between the estimated relationship and the "true" relationship. Also, the income-range averages represent groups of individual observations varying widely in size (from fewer than 5,000

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[37] Subsequent to conducting this analysis using the 1994-1995 Spendable Income table, PDTATAC announced that in FY 2001 a table based on 1997-1998 data will be used instead of 1994-1995 data as was previously anticipated.

[38] See footnote #37.

consumer units to more than 12,000), but each observation carries equal weight in the regression analysis. This further decreases the efficiency of the estimates.

Individual data offers several advantages beyond a larger sample size. First, additional explanatory variables can be added to the equation. The most obvious addition would be family size, but other variables (e.g., age and other demographic characteristics) may also be important. The advantage of additional explanatory variables is that predicted spendable income could be tailored more precisely to the target population.

In addition, a more rigorous methodology could explore alternative functional forms for the relationship between total income and spendable income.

Finally, we should briefly consider the question of whether there should be a spendable income table at all. Why not just have a single, constant proportion of total income "covered" by the COLA, or a single absolute amount of income covered? This concept would be appealing if there were less variation in the total income levels of the population covered under the COLA. The evidence, and common sense, suggests that expenditures on items covered under COLA will constitute a higher proportion of income for lower income members and vice versa. An attempt to set the spendable income amount equal to a constant proportion of total income for all income levels is likely to disadvantage junior enlisted, while setting a constant absolute amount would probably be unfair to officers.

4.3.2. Cost-of-Living Index that Varies By Income Level

Consumption patterns vary by income level. Consequently, some organizations that compute cost-of-living indices (e.g., OPM and Runzheimer International) compute cost of living indices that vary by income level. In particular, the market basket of goods and services for which prices are collected in CONUS and at OCONUS locations would vary by income level. Therefore, the cost-of-living indices would vary by income level. Computing cost-of-living indices that vary by income level presumably increases the accuracy of COLA amounts, in terms of holding members financially harmless for cost-of-living differences across assignment locations. Unfortunately, such a practice substantially increases the amount of data required to ensure reliable estimates. In addition, index values that vary by income (and thus by members' grade) create the potential for additional issues. For example, the potential for the cost-of-living index that applies to higher income members (e.g., officers and senior enlisted) may change at a different rate than the index that

applies to lower income levels. This, after all, would be the point, but would undoubtedly generate perceptions of inequity. For these reasons, we do not recommend introducing further complexity into the system by developing separate indices by income level.

4.4 LOCATION-SPECIFIC COMPENSATION _____

4.4.1 Payment of a Hardship Premium

The private sector and organizations such as the State Department, the World Bank, and the United Nations pay a premium to employees stationed in overseas locations. Because overseas assignment in these organizations is largely voluntary, the hardship premium is largely an incentive to encourage employees to volunteer for the overseas assignment.

The rationale for hardship pay to military members is somewhat different. Because assignment to an overseas location is not necessarily voluntary, the purpose of a hardship premium is largely to compensate members for the hardships incurred because of more onerous living conditions at the overseas location relative to conditions in the U.S. The hardship premium, therefore, can be used to compensate members for differences in living conditions that are not easily reflected in the cost-of-living allowance. Such a pay can at least imperfectly compensate for lack of security or safety, lack of amenities, and so forth at a particular overseas assignment.

In FY 1999, approximately 4,063 military members at 139 locations lived in areas where State Department employees are offered a hardship allowance. The following table (*Table 22*) provides the budget implications of offering a hardship allowance to the Uniformed Services that is similar to the one currently provided by the State Department.

The Department of Defense is developing its own version of hardship pay, using a concept similar to that of the Department of State. For reasons discussed in *Section 6*, it is not possible for a cost of living adjustment to fully compensate members for the differences in living conditions between the United States and some overseas locations. Hence, an additional pay such as DoD's proposed hardship pay is another step towards full compensation. Moreover, if the Uniformed Services were to move closer towards a fully voluntary assignment system, such a pay will increase in importance.

Table 22: Implications of Applying State Department "Hardship Allowance" Pay to Military Members

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	4.24	1.83	2.3	0.52	0.00	0.00	NA	8.89
Additional Annual Benefit per Member ($)	51	36	36	22	1	0	NA	40

4.4.2 Location-Unique Expenditures

At some OCONUS locations members incur expenses that are unique to the location. Because they are unique, the expenses typically are not included in the COLA market basket (or, not in the quantities that reflect expenditures at the OCONUS location). The current practice is to increase COLA amounts at locations where members incur these unique expenses to offset the expenses. The current criteria for covering items as a location-unique (or "COLA-unique") are that the expenditure must be "substantial" (where substantial is not defined), and the expense must be incurred by 50% or more of members at the location.

The system for addressing location-unique expenditures is less systematic than it could be. A good system must have a systematic method for the following.

1. Determining the types of expenditures that should be considered for coverage as a location-unique expenditure—that is, a set of principles or guidelines.

2. Identifying or surfacing specific items for consideration.

3. Determining the payment amount, given coverage.

Below, we suggest a specific method for each of these areas. However, the location-unique issue is one of the most difficult in this area. It is certainly difficult, and perhaps not possible, to develop a perfectly objective, logical and systematic method for determining location-unique items and expenditures.

4.4.2.1 Criteria for Coverage

DoD needs a systematic method to determine what location-unique items will be covered through the COLA program. The following are suggested principles.

- The expenditure for the item should be related to member/household living in a particular location, and the member/household should have little discretion in incurring the expenditure.

- The item should not already be included in the current COLA market basket or, if included, not considered in the quantities required in the OCONUS location.

- Location-unique payment should apply to all at the location.

- The expenditure is not obviously more related to an existing program (e.g., PCS move, DoDDS system).

The first criterion is that members at a location have little discretion in incurring the expenditure. This is not meant to limit expenditures to items of absolute necessity, but to eliminate exotic, discretionary items. This would include items/services that are legally required for the household but not typically required in CONUS—such as taxes in excess of any related CONUS tax for items/services typically consumed in CONUS. One example is the TV tax in the United Kingdom. Other taxes include unusual taxes on automobile ownership and usage. In the case of the TV tax, one could argue that the expenditure is discretionary because the household could always do without TV. However, in today's culture TV could be considered to be a basic item in almost all households and, in that sense, almost nondiscretionary.

Another example of items/services that members have little discretion in incurring are command-mandated safety items, such as the automobile safety kits[39] in Alaska, that the household would typically not purchase in CONUS. One criterion for considering command-mandated items/services under the COLA is that the items/services be for the household—not just the member. That is, the items/services should not be related solely to military operations or duty. Such expenditures should be more appropriately considered part of the Operations and Maintenance portion of the Command's budget.

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[39] The command-mandated safety kits contain items such as a first aid kit, non-perishable food items, a blanket or sleeping bag, flares, etc. Possession of these kits also is highly recommended by the State of Alaska Department of Transportation and Alaska State Troopers.

Other reasons why members at an OCONUS location may have little discretion in incurring specific expenditure include whether the expenditures are required because of local custom or whether the expenditures are incurred because of atypical local conditions (e.g., weather conditions and geography). One test of whether items/services not mandated should be considered under the COLA is whether purchase of the items/services are prudent expenditures.

4.4.2.2 Identifying Items for Consideration

The current method for identifying items that should be considered by the Per Diem committee for coverage is through the chain of command at the location. This is clearly a valid method, and we would not consider supplanting it. However, because commands differ in the degree to which they emphasize the COLA, this, by itself, is unlikely to ensure a systematic treatment across all commands.

A complement to the current process for identifying location-unique items/services to cover under the COLA system is to conduct a periodic, systematic survey of members, households, and command across locations. This will provide the opportunity for all potential items to surface across all commands, and not solely the commands that have chosen to emphasize COLA issues. Items would then, of course, be subject to coverage criteria and approval by the Per Diem committee.

4.4.2.3 Determining Payment Amount

Currently, items are considered for coverage as location "unique" expenditures only if more than 50% of the location's population is estimated to incur the expenditure. But, if approved, all at the location receive 100% of the estimated expenditure in their COLA, even those who do not incur the expenditure. Hence, the 50% rule is, in part, a reflection of the policy to include 100% of the expenditure in the COLA for all members at the location, regardless if they actually incur the expenditure.

Clearly, the current criterion that over 50% of members are expected to incur the expenditure limits the number and types of items that can be included as location-unique expenses. An alternative that avoids the dilemma of compensating members who do not incur the expenditure would be a reimbursement system for location-unique expenditures, only. Under this system, the criterion that at least 50% of members are expected to incur the expense would be dropped. In its place, members would present receipts or "proof of purchase" for items that are covered as

location unique items. Then, only those who incurred the expenditure would receive payment.

We recommend against such a system for two reasons. First, there may be additional administrative costs of verifying purchase and authorizing and administering reimbursement. Second, the reimbursement system would induce some members, who otherwise would not have considered purchasing an item, to purchase the item because they would receive reimbursement. They may value the item at much less than its cost, but would purchase it anyway as long the cost was reimbursed. Such a system would induce inefficiency.[40]

Nevertheless, we believe it is arbitrary to categorically exclude potential items from some coverage simply because fewer than 50% of member incur the expenditure. Instead, we propose the following. When fewer than 100% of members incur the expenditure, we suggest that the payment amount be limited to the product of the estimated proportion of members who incur the expense and the average expense incurred.[41] Thus, the total payment by the Uniformed Services would equal the total cost incurred by members. Payment for location-unique expenses covered under the COLA, however, goes to all members at a location—it is not a reimbursement. Consequently, payment for items purchased by only a small proportion of members at a location will result in a large proportion of members being paid for an expenses not incurred, while members who incur the expense receive only partial compensation for the expenditure. The method allows some coverage for items that would otherwise not be considered. Moreover, under such a system there may well be a number of such items covered. An individual member may actually incur expenses for only one or two. But, by compensating for all items "on average" the individual member may be about as well off, on average, as if they were fully reimbursed for the covered items for which they actually incur expenditures.

Under such a system, members would be receiving the correct amount "on average". While this may at first appear bizarre, in that it does not guarantee than any member receive exactly the "right' amount of

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[40] A possible exception to this recommendation against a "reimbursement" system is the case in which the member incurs a legally acquired expenditure, such as a tax.

[41] This amount is the "expected value" for all members, and is calculated using the formula:

$$payment = p \times (A_{OCONUS} - A_{CONUS}),$$

where p is the proportion incurring the covered expense, and A is the actual cost incurred by members at the OCONUS location and the typical CONUS location. Estimates of A and p may be constructed or determined through a systematic survey of members.

compensation for items incurred, the entire market basket approach that underlies the major part of the index makes the same assumption. That is, some members consume more fish, relative to other meats, than others, some members dine out more frequently than others, and so forth. The market basket and expenditure weights are in fact "averages" of actual expenditures made by military families, who vary in their expenditure patterns.[42]

If 100% of members do, in fact, incur the expenditure, it would of course be included at 100%. For legally required items/services, such as mandated items (or taxes), the payment amount should pay 100 percent of the differential between OCONUS and typical CONUS expenditure (CONUS expenditure may be zero) for all members. Finally, one could lower the threshold for full coverage as a matter of policy. For example, the policy could be adopted that the full amount is paid for an item if 80% of members incur the expenditure.

The current system for payment of location-unique expenditures is an "all or none" system under which 100% of the cost of an item is paid through COLA if at least 50% of the members incur the expense, but no payments are made if fewer than 50% incur the expense. We are suggesting an alternative policy under which otherwise appropriate items can be included as location-unique items even if fewer that 50% of members incur the expenditure. The payment would be made to all members at the location, but would be covered only at the "expected value" of the expenditure for all members. That is, the full cost multiplied by the estimated proportion of the location's population that incur the expenditure. While this would not result in exact reimbursement for any member, the same is true for the "market basket" of items underlying the COLA index itself.

4.4.2.4 Applications

In Alaska, weather conditions require that members in some locations (especially northern locations) purchase special equipment for their automobiles. These expenses are not fully covered under the current program. Items currently not covered include special snow tires and chains, and block heaters.

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[42] This point may become clearer when one considers the large number of households that underlie the Consumer Expenditure Survey, from which expenditure weights are derived. Surely no one believes that

We estimated the cost to the Uniformed Services of expanding car winterization and safety kits expenditures under the COLA in Alaska (*Table 23*). These estimates are based on several assumptions:

- Winterization kit expenditures consist mainly of snow tires (at $400/set) and block heater, trickle charger and blanket (at $300/kit);

- Members would incur these costs once per 3-year tour for each car and the resale value for heater & charger is 50% of the purchase price;

- Members without dependents have one car while members with dependents have two cars;

- Members with dependents will spend approximately $250 per 3-year tour to purchase items in the safety kits; members without dependents will spend approximately $150 per 3-year tour.

The estimated annual cost for the winterization kits across all Uniformed Services is approximately $5.3 million. The annual cost for safety kits is approximately $1.2 million.

Table 23: Estimated Cost To Cover Car Safety Kits and Winterization Kits Under the COLA in Alaska

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Members in Alaska	6,180	77	9,538	24	975	1	207	17,002
Estimated # Cars	10,412	125	16,107	45	1,619	2	414	28,724
Total Cost of Winteri-zation Kits	$1,908,867	$22,917	$2,952,950	$8,250	$296,817	$367	$75,900	$5,266,068
Total Cost of Safety Kits	$450,067	$5,450	$695,867	$1,900	$70,217	$83	$17,250	$1,240,834
Total Cost for Kits	$2,358,934	$28,367	$3,648,817	$10,150	$367,034	$450	$93,150	$6,506,902
Cost/ Member in Alaska	$382	$368	$383	$423	$376	$450	$450	$383
Cost/ Member in Service	$29	$0.56	$59	$0.44	$101	$38	$223	$29

In Guam, Hawaii, Iceland, and the United Kingdom, members are required to quarantine their pets upon entry into the country. These costs can be substantial, as indicated by the table below. Members currently pay these expenses out-of-pocket. The 19,360 members newly assigned to one of these four locations in FY 99 brought approximately 2,592 pets that required quarantine at a cost to the members of an estimated $3.3 million (or approximately $1,276 per quarantine).

Table 24:   Estimated Pet Quarantine Costs, FY 99, for Army, Air Force, Navy, and Marine Corps.

Location	Pet Quarantined	Aprox. # New Members	% New Members Who Incur Cost	Average Cost/ Quarantine	Total Cost
Guam	280 25% cats, 75% dogs	2,368	12%	$1,055/cat $2,375/dog	$572,600
Hawaii	1,522	10,621	14%	80%@$655 20%@$1,080	$1,126,110
Iceland	23 10 cats, 13 dogs	1,037	2%	$2,360/Cat $3,860/Dog	$73,780
UK	767	5,334	14%	$2,000	$1,534,000
Total	2,592	19,360	13%	$1,276	$3,306,490

Below (*Table 25*) we list several items that are, or have been suggested to be, covered under the COLA and compare them against the criteria for coverage discussed above. Application of these criteria suggests that the TV tax in the United Kingdom and car safety and winterization kits in Alaska be considered location-unique expenditures to be covered under the COLA program. Pet quarantine costs are more aptly related to PCS move expenditures, and therefore could more logically be reimbursed under the PCS program. Likewise, the cost of dependent student's overnight school trips are linked to dependent's educational costs and could more logically be considered for reimbursement under the Department of Defense Dependent Schools (DODDS) program (as discussed previously).

Table 25: Checklist: Coverage of Location-Unique Expenditures

Item	Environ-mental Condition	Not in Market Basket	Little Member Discretion	Other Program	Law or Mandate	Local Custom	Cover under COLA?
UK TV Tax	X	√	√	√	√	√	Yes
Safety Kits in Alaska	√	√	√	√	?	NA	Yes
Car Winterization Kits in Alaska	√	√	√	√	X	√	Yes
Pet Quarantine in HI, UK, Iceland, and Guam	√	√	X	X (PCS move program)	√	NA	No
Cost of dependent student's overnight school trips	X	√	√	X (DoDDS)	X	X	No

4.5 COLA SAFETY NET _____

Currently, members receiving COLAs at OCONUS locations can face dollar reductions in their COLA because of (1) declining prices at the OCONUS location, (2) prices rising faster in CONUS than at the OCONUS location, and (3) favorable exchange rate changes. If the COLA declines because local prices have declined or because the dollar is worth more in the local economy, it is reasonable that the COLA payment itself should decline to reflect the reduced cost-of-living, in dollar terms. However, it is possible that a reduced COLA may impose a short-term hardship on members for at least three reasons. First, if local prices decline, a member's cost of living might not decline if he or she has entered into longer-term arrangements at fixed prices. Second, the member's COLA might decline not because local prices have declined, but because prices in CONUS have risen. While it is true that, without an adjustment in COLA, the member may be better off than he or she would have been at now higher domestic CONUS prices, it is nevertheless clear that the member's cost of living at the OCONUS location has not declined when U.S. prices rise. Third, an apparent decline in living costs due to favorable movements in the exchange rate might be offset by a concomitant rise in local prices. Such a price rise would go unmeasured until the next annual price survey, under typical policies.

Other allowance systems, notably that of The World Bank and the military's Basic Allowance for Housing (BAH), include a "safety net" that

protects members from declines in income due to relative price changes under some circumstances. The World Bank safety net feature protects bank employees from a decline in the COLA, below the base amount for the year, due either to exchange rate fluctuations or an increase in prices at the comparison location (i.e., Washington D.C.). The BAH of an individual member is not permitted to decline for the member over the member's tour, recognizing the complications entailed by fixed commitments.

4.5.1 COLA Midpoint System

Both the State Department and the World Bank use a "COLA Midpoint" system that, presumably, requires less frequent adjustments to the COLAs. Under this system, the actual COLA payment does not change as long as the COLA index remains within a certain interval—typically five percentage points at the most relevant range of index levels. When the actual index moves outside of this range, the COLA does adjust to the payment implied by the new midpoint of the range.

Fewer adjustments may better allow members to manage their household budget. One major problem with this midpoint system, though, is that when COLA adjustments are required the percentage change in the COLA can be quite large. Hence, instead of frequent, small adjustments, the member would be subject to less frequent but large adjustments. Furthermore, as described in *Section 2*, DoD currently uses an alternative approach to reduce the number of COLA adjustments that could result from minor fluctuations in exchange rates. The current approach uses cumulative measure of the difference between the market exchange rate, and the exchange rate being used to compute the current COLA. If this cumulative difference exceeds the threshold of 5%, then the COLA is adjusted. For these reasons, we do not pursue the approach of using a midpoint system.

4.5.2 Safety Net for COLA Declines Due to Changing Prices

One option for a DoD COLA "safety net" would be to guarantee the member against COLA decreases, apart from exchange rate adjustments, over the length of the members' tour. However, if local prices are declining, the member is not merely held harmless, but made better off. A second option is to protect the member, over the initial period of the assignment, for declines in the COLA that are due to rising CONUS prices, and not to declining local prices. This alternative recognizes that,

without a decline in local prices, a reduction in the COLA makes the member worse off in a real economic sense.[43]

The current pay system, however, cannot track members' transfer dates. Consequently, a safety net that is member-specific is not possible at this time. Therefore, until such time as the system is able to track member transfer dates, the safety net should apply to all at the location.

4.5.3 Safety Net for Large Exchange Rate Changes

Exchange rate changes occur almost continuously, and often have little effect on financial commitments made in local currency. However, major exchange rate fluctuations symptomatic of a distressed local economy may occur at the same time as rapid price inflation. Because the member would face significantly higher local prices for goods and services at the same time that the rapid decline in the exchange rate would reduce the COLA amount, the member would be made worse off until local prices are sampled and the COLA restored.

One solution to this problem is for the Command at the locality to initiate an out-of-cycle price survey. Another option is to freeze downward COLA adjustments at a level implied by, say, a 30% decline in exchange rate until the next price survey. For example, the maximum percentage decline could be set to 0.3x(portion of spending in the local economy). This would put an upper bound in the COLA decline until local prices can be formally measured.

For example, in Japan, where 52% of the goods are purchased in the local economy, the maximum allowable decline would be 0.3x0.52=0.156 (or 15.6%). Although such a system would not completely eliminate COLA reductions due to exchange rate fluctuations, it would limit adverse consequences by preventing further downward adjustment until the next price survey occurred. If prices rise during this period, the safety net would also allow time for command to initiate an out-of-cycle price survey in order to compensate members facing higher prices.

One drawback of this plan is the fact that the permissible level of decline in COLA is tied to spending patterns at the locale. A similar but simpler system may be to set the maximum decline in total COLA due to exchange rate changes between schedule price updates at 15% of total COLA. While these alternatives limit potential harm to COLA recipients, they potentially increase the costs of providing COLA, and increase the complexity of exchange rate calculations within the OCOLA process.

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[43] Note, however, that relative to how the member would fare in the US economy, he or she is better off.

The tables below provide an indication of the budget cost associated with an overseas COLA "safety net". The first is an estimate of the "cost" of the safety net recently applied in Alaska. The second and third are illustrative budget costs associated with a safety net when the COLA would have declined due to a drop in local prices and with a rise in CONUS prices, respectively. Note that the "cost" is relative to the expenditure savings that would have accrued if the safety net were not in effect and the COLA would have declined. Note also that actual costs resulting from a "safety net" will depend on the particular circumstances associated with the price changes.

Table 26:   Safety Net Cost Implications for Recent Index Changes in Alaska

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	2.65	0.10	5.61	0.03	0.07	0.003	NA	8.47
Additional Annual Benefit per Member ($)	428	1,330	588	1,422	76	2,669	NA	498

Table 27:   Safety Net Cost Implications of 1% Increase in CONUS Prices, All Else Equal

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	15.60	9.48	12.47	3.28	0.77	0.00	NA	41.60
Additional Annual Benefit per Member ($)	189	187	199	143	211	310	NA	187

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Table 28:   Safety Net Cost Implications of 1% Decline in OCONUS Prices, All Else Equal

Service	Army	Navy	Air Force	USMC	CG	NOAA	PH	Total
Additional Annual Budget Cost ($M)	15.75	9.57	12.60	3.31	0.78	0.00	NA	42.01
Additional Annual Benefit per Member ($)	191	189	201	144	214	313	NA	189

5. RECRUITING AND RETENTION IMPLICATIONS OF THE COLA PROGRAM

The overseas COLA is a relatively modest component of members' total compensation. The COLA is intended to keep members and their families from suffering financially when assigned overseas and thus is not intended as a "real" increase in pay. Nevertheless, failure to adequately compensate members for the higher cost of living at OCONUS assignments would constitute a real decrease in compensation. COLA is paid purely on the basis of measured differences in cost of living between the continental United States and the OCONUS location. Consequently, the COLA is not likely to be an effective or efficient mechanism to address recruiting and retention problems, compared, for example, to selective reenlistment bonuses, in the sense that it is not readily targeted to specific recruiting or retention problems.[44]

To the extent that overseas assignments are viewed as a financial hardship, the overseas COLA can lessen the hardship or partially compensate for it. A COLA that is viewed as insufficient or inequitable will likely have a detrimental effect on recruiting and retention.[45]

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[44] In a sense, OCONUS COLA is like the PCS reimbursement program. We would not expect increases in retention, over and above normal retention rates, for those who receive reimbursement for the cost of their PCS moves. However, we would anticipate adverse consequences for retention if compensation for the costs of moving were inadequate.

[45] In the private sector literature, Anderson (1990) notes that the failure to select the most interculturally suitable expatriates increases the risk of failure abroad in terms of attrition, turnover, separation and replacement costs, lowered productivity, and higher maintenance requirements (i.e., time and expense devoted to dealing with "problem"

While not structured as a retention tool, the overseas COLA will have a positive effect on retention, compared to a case where there is no cost of living adjustment. We estimated the retention effects of the COLA using the Annualized Cost of Leaving Model (ACOL) model. The ACOL model compares enlisted retention both with and without the overseas COLA. Eliminating the COLA would reduce the aggregate first reenlistment rate of members stationed OCONUS –those who would have received the payment by about 1.65 percentage points and would reduce the aggregate second term rate of members stationed OCONUS by about 1.28 percentage points. This is a 3% increase in the first term reenlistment rate, and a 1.7% increase in the second term reenlistment rate.[46]

The ACOL model also can be used to estimate the retention effects of increasing the COLA. For example, increasing the COLA by indexing the spendable income table that will be implemented in FY 2001 to the consumer price index would increase the aggregate first term reenlistment rate for members stationed OCONUS by about 0.27 percentage points. The aggregate second term reenlistment rates would increase by about 0.21 percentage points.

6. THE OCONUS COLA AND VOLUNTARY ASSIGNMENT

To some degree, each Service attempts to fill assignments voluntarily by matching members' preferences against available assignments. However, none of the Services currently has a completely voluntary assignment system. In many cases, members do not receive their "first-choice" assignments. The rationale for using a voluntary assignment system is that it will improve retention and readiness. In an all-volunteer force, all assignments are ultimately voluntary—if a member dislikes a particular assignment sufficiently, he or she may leave. The GAO reported that, in 1998, the Air Force conducted a survey of 633 departing personnel

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expatriates). Within a year of repatriation, 25 percent of employees leave their company (Black, 1988). Organizations may lose almost half of their repatriates within three years of their return to the U.S. (Gregersen & Black, 1990; Carter, 1989). However, it is unclear whether the high separation rate for employees returning from abroad is the result of a negative overseas experience, increased job opportunities or earnings potential for an employee with overseas experience, or other factors.

[46] To put this in perspective, the effect on the first term reenlistment rate for those who would receive the COLA is about the same as a level 1 Zone A reenlistment bonus.

to determine their reason for separating (GAO, 1999).[47] The survey participants were asked if there was one single thing the Air Force could do to keep them in the service. Of the 35% of enlisted personnel and 48% of officers who responded in the affirmative, the most frequently cited change was more choice in assignments.

In addition, a voluntary assignment system is likely to reduce assignment turnover. Under the current system, there is the notion that one balances "good" assignments with "bad" assignments for members. There is a notion of "share the pain, share the gain" that induces rotation simply to achieve this form of equity.

Under a volunteer system, rotations simply to "share the pain, share the gain" would be reduced. Those who volunteer for an assignment are more likely to complete the assignment and, if relevant, volunteer for an extension. If so, this means lower permanent change in station (PCS) costs. It also may mean that the transient account could enjoy a significant reduction under a voluntary assignment system. Further, reduced turnover and longer tenure at an assignment is likely to improve performance or productivity of members at the assignment.

There are two potential sources for productivity improvement. First, if turnover is less, the relatively unproductive times at the beginning and end of a member's tour are reduced. Second, if there is assignment-specific factors affecting productivity, increased time on assignment will provide a longer period of productivity improvement through a "learning curve" effect.

Finally, under a more voluntary assignment system, the cost of particularly difficult-to-fill assignments will be more apparent to the Services. As we suggest below, incentives will be established within overall budget constraints, based on supply and demand, to fill difficult to fill positions. The cost of these incentives will make the cost of such positions more explicit to the Services. This, in turn, will provide a budgetary incentive for the Services to find innovative ways to meet mission demands while reducing or economizing on particularly onerous positions.

The OCONUS COLA is one tool for attaining a higher proportion of voluntary assignments at overseas locations. In order to understand the

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[47] General Accounting Office (February 1999). *Military Retirement: Proposed Changes Warrant Careful Analysis*. Testimony of Mark E. Gebicke (Director, Military Operations and Capabilities Issues, National Security and International Affairs Division) before the Subcommittee on Military Personnel, Committee on Armed Services, House of Representatives.

role of the OCONUS COLA in encouraging voluntary assignments, it is important to first consider reasons that members prefer some assignments to others. These factors include:

- Differences in the cost of living,

- Environmental conditions (e.g., the climate, local culture),

- Type of duty,

- Family separation,

- Spouse employment opportunities,

- Nationality of spouse,

- Dependents' educational opportunities, and

- Cultural and other amenities.

The OCONUS COLA is only designed to address the first factor (cost of living). Some members may find certain differences between CONUS and OCONUS assignments appealing, while other members may find these same differences less appealing. A voluntary assignment system may provide a way to allocate overseas assignments to those qualified members who prefer them.

6.1 COMPARISON TO
PRIVATE-SECTOR FIRMS _____

Under the current system, the military assigns members for overseas assignments. Although members may submit a list of assignment preferences, there is no guarantee of a member receiving his or her first (or even second) choice. Although the military's assignment system is quite different than that used in the private sector by international companies, research on overseas assignment of private-sector employees provides useful information to evaluate the military's assignment system.

In many international companies, employees apply for overseas assignments or are hired with the expectation that they will be assigned overseas. In some international companies, employees are expected to take an overseas assignment as part of their career development. In other companies, employees are assigned to the overseas location to fill a special need. Since employment in private-sector firms is also voluntary, personnel managers with overseas positions to fill are also interested in the factors affecting employees' willingness to accept such assignments.

Not surprisingly, several studies show that employees are more willing to relocate overseas when they are single or their spouses support the

move. Also, concerns about spouse employment and dependent education and medical care play a large role in the decision.

Borstorff et. al. (1997) examine relationships of the following factors with employees' willingness to take expatriate assignments: 1) employee characteristics, 2) employee job and relocation attitudes, 3) spouse characteristics and attitudes towards relocation, and 4) organization relocation support activities. They find that employees more willing to accept overseas assignments tend to be: 1) single, 2) have prior international experience, and 3) be committed to their professional careers and to their employing organizations. Also, the careers and attitudes of spouses have a significant impact on employee willingness to move overseas.

In a 1994 survey conducted by the National Foreign Trade Council (NFTC), more than half the respondents considered the careers of their spouses as a major factor for turning down an overseas job assignment, and 81% felt family considerations to be a primary reason candidates turn down overseas assignments. The three main categories of concern were (1) career interruption of spouse, (2) special needs of children (e.g., educational, medical, or social), and (3) responsibility for parents or other relatives (Swaak, 1995).

Feldman and Thomas (1992) reported that free choice concerning expatriate assignments and realistic job previews were related to subsequent success and adjustment in expatriate assignments. Perceptions of care and fairness in selection decisions are salient to employees relinquishing control in a relocation; employees need to feel the organization has a rational selection procedure, rather than just sending anyone to fill a spot (Borstorff et al., 1997).

Brett, Stroh and Reilly (1992) report that over half of all U.S. married couples have dual career status, with the number expected to increase to almost two out of three by the year 2000. The authors report that research at Mobil Oil concluded that such a projected increase would lead to a 50% refusal rate as well as a 20% turnover rate among Mobil's employees seeking to avoid relocation.

6.2 DESCRIPTION OF VOLUNTARY ASSIGNMENT SYSTEM_____

The purpose of a voluntary assignment system is to better match the OCONUS staffing needs of the Uniformed Services and the preferences of their members. Because a voluntary assignment system is easily misunderstood, we clarify what it is not. First, the system we are

suggesting would not apply to deployments within an assignment. That is, if the unit to which members are assigned is deployed, those deployed would not be restricted to volunteers. Second, the voluntary system would be suspended in time of war or national emergency. Third, the system does not necessarily need to apply to first duty assignment of enlisted or officers; however, the nature of initial assignments should be made explicit to the recruit or potential officer, so that he or she makes an explicit, voluntary decision upon enlistment. Five principles underlie the concept of a voluntary assignment system:

1. The Services make a commitment to staff as many assignments as possible (including overseas positions) with volunteers.

2. The volunteers must be qualified for the positions.

3. Members are provided with full information on living and working conditions associated with assignments.

4. Within the limitations of an affordable budget, monetary incentives should be used to encourage qualified volunteers to staff hard-to-fill assignments

5. If necessary, traditional (non-voluntary) assignment practices will be used to preserve readiness as a last resort.

The system, therefore, matches members with jobs. Under such a voluntary system, members sort themselves across locations by their specific circumstances and tastes such as:

- Preference for warm or cold climates,

- Preference for rural or metropolitan areas,

- Desire to experience different cultures,

- Spouse employment circumstances/opportunities, and

- Dependents' education circumstances/opportunities.

Ideally, the set of qualified employees available within a time period just matches with the set of available assignments. In practice, of course, the match will be imperfect. Some jobs will have a surplus of applicants, while others will have no volunteers.

A voluntary assignment system would increase the use of monetary incentives to voluntarily fill assignments at difficult-to-fill locations. Examples of such monetary incentives in the Uniformed Services include the Career Sea Pay, the Army's location-specific SRB, the Navy's initiative for Distribution Pay and the new Hardship Pay. Such incentives

could help fill assignments that would not otherwise draw volunteers. This type of special pay could incorporate the non-pecuniary aspects of living overseas—such as loss of spousal income, educational opportunities for dependents and desirability of the location, as well as the arduousness of the duty.

Location-specific incentive pays could vary to adjust for discrepancies between supply and demand. They would not have to be based on differences in the cost of living. Pay rates could be increased for locations/assignments that are not being filled, and adjusted downward or eliminated for assignments with a surplus of applicants.

A voluntary assignment system employing a combination of COLAs and incentive pays could have a positive effect on retention and recruiting. Coupled with as much information as possible about the location, the incentive pays would compensate for non-pecuniary differences in locations that the COLA system does not consider.

6.3 THEORY UNDERLYING A
VOLUNTARY ASSIGNMENT SYSTEM _____

The model introduced in *Section 2* provides a way to illustrate the theory underlying a purely voluntary assignment system. Assume we have two positions to fill, one in CONUS (C) and one in OCONUS (OC), and two qualified members to fill them, member "i" and member "j". Recall that we introduced the notion of the member's welfare or "utility function":

$$U_i = U_i(p_c, E_c, I)$$

which provides a (notional) measure of the member i's anticipated well-being at particular assignment location. In this instance, the member's well being with a CONUS assignment is a function of the prices in CONUS measured by price vector p, the environment in CONUS, measured by vector E, and income I.

Now, introduce a second, overseas assignment possibility for individual i:

$$U_i = U_i(p_{oc}, E_{oc}, I)$$

Member i will volunteer for the overseas assignment only if:

$$U_i(p_{oc}, E_{oc}, I) > U_i(p_c, E_c, I)$$

Similarly, member j would volunteer only if:

$$U_j(p_{oc}, E_{oc}, I) > U_j(p_c, E_c, I)$$

Let us suppose that the inequality is true for member j, but not for member i. Member j will volunteer for the position, while member i will not. By staffing with volunteers, we are able to assign members i and j to the positions that maximize their well-being, while an involuntary assignment system would have done so only by chance.

Now, assume that neither member would volunteer. That is, both members prefer the CONUS assignment to the OCONUS assignment. However, both would volunteer if the OCONUS assignment included an additional monetary incentive —a compensating differential. That is,

$$U_i(p_{oc}, E_{oc}, I + \Delta I_{i,OC}) = U_i(p_c, E_c, I)$$

and

$$U_j(p_{oc}, E_{oc}, I + \Delta I_{j,OC}) = U_j(p_c, E_c, I)$$

Now, with additional income, perhaps in the form of a special pay, both members would be willing to volunteer. Which should the Service accept? Again, as long as the members do not have the same tastes and circumstances, they should assign the volunteer for whom the compensating pay, ΔI, is smaller. This minimizes the cost of filling the position to the Service, and again makes both members at least as well off, and generally better off, than they would be under an involuntary assignment system.

With larger numbers of positions to fill and larger number of members to fill them, this simple model would suggest that the compensating payments, the ΔI's, should be set by supply and demand for each location. Pay differentials should be set at levels sufficient to attract the right number of members to keep the positions staffed with qualified volunteers. The actual differential at each location will be determined by the "marginal" volunteer, the ΔI just sufficient to attract the final volunteer required to fill all the positions at the location. For this member, the payment exactly compensates the member for the hardships associated with the assignment. That is, for the "last" volunteer, we are able to determine the dollar value of environmental and other factors that make this a less attractive assignment. These are factors for which a COLA, alone, cannot be expected to compensate. All of the "infra-marginal" volunteers—those who would have volunteered at lower increases in pay, will actually prefer that assignment to any other.

A voluntary assignment system, with compensating pay differentials set by supply and demand:

- Matches the preferences of members with assignments;

- Fully compensates members for the disamenities associated with various assignments; and

- Does so efficiently.

6.4 THE ROLE OF OCONUS COLA_____

Relative to other aspects that may make one location more or less desirable than another, cost-of-living differences can be measured relatively easily, albeit imperfectly. Hence, a solid location-specific COLA system is an important complement to a voluntary assignment system. Most members will not know how the cost of living differs across various locations. A policy that holds members harmless for most out-pocket expenses associated with assignments would make filling positions easier, reducing this aspect of uncertainty for the member and his or her family.

Voluntary selection of members into assignments reduces reliance on the COLA to compensate for other location-related disparities for which it is not well-suited, such as spouse employment or dependent education issues. Thus, the Services should see a greater degree of member "buy-in" on the COLA. Just as the voluntary assignment system requires active education of members with good information on different duty locations, DoD and the Services must continue to educate members about the OCONUS COLA program.

6.5 SUMMARY _____

A voluntary assignment system is a natural extension of the all-volunteer force. An explicit commitment to a volunteer assignment system can improve recruiting and retention and ease demands to extend the COLA program beyond its original charter. In addition, such a system could reduce the number of PCS moves and associated costs, reduce the transient account, and increase productivity.

To achieve a successful voluntary assignment system, the Services must:

- Provide members with good information on assignment locations,

- Guarantee a solid overseas COLA program,

- Provide commands with good information on qualified candidates,

- Develop a reliable system for matching members with assignments (an assignment "marketplace"), and

- Establish a long-term commitment to maximizing voluntary assignments.

Members find OCONUS assignments relatively attractive or unattractive for many reasons. Some members may find certain differences between CONUS and OCONUS assignments appealing, while other members may find these same differences unappealing. The overseas COLA is designed only to address differences in cost of living. A voluntary assignment system may provide an adjustment vehicle for the other differences between CONUS and OCONUS assignments.

Under the current system, the military assigns members for overseas assignments. Although soldiers may submit a list of preferences for assignment, the system is largely involuntary. The purpose of a voluntary assignment system is to better match the OCONUS staffing needs of the Uniformed Services and the preferences of their members. An underlying principle in such a system is to staff overseas positions, as much as possible, with volunteers. (The system does not necessarily need to apply to first duty assignment of enlisted or officers).

Although the military's assignment system is quite different than that used in the private sector by international companies, research on overseas assignment of private-sector employees provides useful information to evaluate the military's assignment system. The incentive pays for voluntary assignment would be more reflective of the purpose of pay allowances and premiums paid to employees of many international companies when the employees are transferred overseas. Private firms view these salary adjustments as compensation for both cost of living differences between CONUS and overseas assignments and compensation for the non-pecuniary aspects of overseas assignments.

A voluntary assignment system, combined with various incentive pays, could have a very positive effect on retention and, perhaps, recruiting. Coupled with as much information as possible about the location, these pays would compensate for non-pecuniary differences in locations that the COLA system does not consider.

A solid location-specific COLA system is an important complement to a voluntary assignment system. Policies such as a holding members harmless for most out-pocket expenses associated with assignments would makes filling positions easier. Cost-of-living differences at OCONUS locations are liable to be more volatile and unpredictable than other location-specific differences across time, which makes it more difficult for

the member to assess this aspect of an OCONUS assignment prior to assignment.

A volunteer force implies that the assignment system is voluntary in the long run. Thus, members will leave if assignments are consistently unpleasant. A voluntary assignment system would be a renewed commitment to filling spaces with volunteers.

7. ADMINISTRATIVE ISSUES

We consider two issues with regard to the administration of the OCONUS COLA. The first concerns its payment solely as a per diem rate. The second concerns who, administratively, should determine whether an expenditure issue associated with an OCONUS assignment is a COLA (i.e., cost of living issue) to be considered by the Per Diem committee in that context, or whether it should be directed, at least initially, to those who administer some other, more relevant program.

7.1 LUMP SUM PAYMENTS
UNDER OCONUS COLA _____

By law, the overseas cost-of-living allowance must be paid as a per diem rate. The COLA, itself, is paid in semi-monthly pay checks. The payment made is the product of the number of days in the period and the per diem (per day) rate. This seems quite reasonably for items that are purchased almost continuously over the year, such as food and clothing. However, there are some expenditures that are clearly "lumpy". They are large expenditures that are made, perhaps once per year or even once per tour.

Currently, the cost of "lumpy" expenditure items is converted to an implied daily rate and amortized over the calendar year. An alternative would be to make periodic lump sum payments to members, at the appropriate time, for those expenditures that the members must pay out as a lump sum. Presumably, the time at which they are paid would coincide, as much as is practical, with the time at which they are typically paid by the member.

The current system has the administrative advantage that the payroll system does not have to track or adjust for these periodic special payments. Moreover, the constant per diem rate eliminates issues that may arise concerning the timing of the special payments and

arrivals/departures, or recoupment of payments for members who fail to complete a tour.

On the other hand, the member may have to finance some large expenditures out-of-pocket. While the member may recoup the payment over time through the semi-monthly COLA payment, the member will not recoup the implied interest. Moreover, financing the large expenditure may impose a significant hardship on the member and the member's family, at least until the COLA payments can catch up.

A special payment representing large expenditures that are covered under the OCONUS COLA at a particular location is likely to improve the welfare of the member and the member's family. If the payment were to come as the member begins the assignment, the payment itself would help to ease the financial hardship that undoubtedly occurs for many members, especially junior enlisted members with families, during the transition to the new location. There are likely to be additional payroll costs associated with such payments, particularly if the timing of special payments is customized to each member.

An important problem that immediately arises once one considers the special lump-sum payments for some types of expenditures is: which expenditures? One way to avoid this problem is to strictly limit the special, lump sum payment, at least initially, to substantial "lumpy" expenditures that are required by law or mandate. The automobile tax in Singapore is one example.

Any deviations from the "per diem" payment of OCONUS COLA would, of course, require legislation. The benefit to junior enlisted members could be substantial, especially of the special payment were made in the early days of a new assignment. Such a feature would be approximately budget neutral. There would be some additional payroll and other administrative costs associated with the feature, and there may arise some recoupment issues with members who do not complete a tour.

7.2 ADMINISTRATIVE DETERMINATION
OF PROGRAM JURISDICTION _____

Members and their families incur numerous expenses that are, in some way, related to the member's OCONUS duty assignment. Issues routinely arise over time regarding the coverage of additional items or types of expenses as part of the OCONUS COLA program. Not surprisingly, many of these warrant the serious consideration of the Per Diem, Travel and Transportation Allowance Committee (PDTATAC) for coverage under

OCONUS COLA.[48]   In other instances, however, the case for coverage under the OCONUS COLA program is much less compelling. We have found, however, that, for may items raised, initial consideration for coverage may more appropriately belong in some other program area. Examples include items that may be associated with a Permanent Change of Station (PCS) move, expenses related to the education of a dependent child, or items that are more appropriately considered as operations and maintenance (O&M) expenses of the commands under which the expenses arise.

Currently, there is no formal body or committee for making initial determinations of the appropriate "jurisdiction" for a given item and insuring follow-up and closure. By default, the PDTATAC is the ex-officio committee to do this. However, if one were to refer a particular item to the Department of Defense Dependent Schools (DoDDS) for consideration of coverage as a reimbursable expense, for example, there is no formal requirement for DoDDS to provide an opinion or recommendation with its justification and no clear process for coming to closure on the issue. Under the current system, an item may be simultaneously considered under two or more programs, with no program clearly assuming the lead.

One solution would be to give PDTATAC this mission, which they often assume by default. However, PDTATAC is the sponsor of one of the major programs for which jurisdictional coverage is often contended. Hence, it may be perceived as a less than neutral initial arbiter in some instances.

Instead, we suggest the formation of a different committee. The purpose of the committee would be to make an initial determination of the appropriate program under which a specific expense-related item is to be addressed, and coordination of an ultimate decision on the issue. The committee's initial recommendation of program jurisdiction would require that those who administer that program make a specific recommendation regarding coverage of that item, along with a rationale for that recommendation. The committee would then accept that recommendation, or ask for reconsideration. The committee itself would be responsible for ensuring closure—that the issue does not simply disappear into the bureaucratic mist.

There would be two categories of membership in the committee. The primary members would be the Directors of Compensation Policy for the Office of the Secretary of Defense and each of the Uniformed Services,

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[48] In *Section 4*, we have suggested some guidelines or criteria for coverage.

and the Chairman of the PDTATAC. The secondary members would be the directors of the relevant programs for which an item may eventually be referred. The Chair of the committee would be the Director of Compensation Policy for the Office of the Secondary of Defense. When a particular item arises, the primary members would quickly determine the likely applicable program(s) under which the item may be considered. The relevant secondary members would be asked to participate in the deliberations after that point. The intent would be to include in deliberations those who have a direct stake in the issue, and economize on the time of others.

8. SUMMARY AND RECOMMENDATIONS

We have reviewed the current system for determining and administering the OCONUS Cost of Living Allowance from several perspectives. Our most fundamental conclusion is that, conceptually, the CONUS market basket approach to determining the cost of living adjustment is sound and is similar to the approach used by many private sector multi-national firms and international organizations. The system can be improved in a number of dimensions, however.

There are a number of substantive issues regarding what is included in the market basket and how they should be included. We have made specific recommendations on these issues. We also addressed a large number of technical issues regarding how data is collected and used. Recommendations are also made in this important area. Finally, we have considered two issues associated with the administration of the OCONUS COLA: its payment as a per diem or daily rate, and the organization change to help in determining which issues are OCONUS COLA issues and which issues might better be considered under alternative programs.

Table 29 summarizes our findings and recommendations. The issues are organized by section, in the same way they are presented in the text. We include a brief description of the issue, reference the section of the text in which it is discussed, summarize the recommendation as appropriate, and present an estimate of its total annual cost, if relevant.[49,50]

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[49] Note that cost estimates are of two types. The first is our best estimate of the annual budget cost of implementing a specific change, when there is, conceptually, a clear budget cost. The second type of estimate presents costs under a particular contingency or scenario. For example, the cost associated with the incorporation of a particular type of "safety net" depends on the scenario, while the cost of including a round-trip home to the United States per tour does not. We attempt to distinguish between the two types in the table.

[50] The table in *Appendix B* breaks out estimated costs by Service.

Table 29. Summary of Issues and Findings

Section in Report	Issue/Scenario Analyzed	Cost/Benefit per Year for Policy/Scenario Analyzed		Recommendations
		Total Cost ($Millions)	Benefit per Member ($)	
Cost-of-Living Index Structure				
4.1.2	The Living Pattern Survey is currently used to determine the government facility/local economy expenditure shares. Alternatives to the current system include: ▪ Use CONUS expenditure shares at all OCONUS locations. ▪ Use expenditure shares that are a weighted average of OCONUS and CONUS estimates (e.g., 75% OCONUS and 25% CONUS). ▪ Use expenditure shares estimated using a multivariate regression model that predicts the expenditure share based on the characteristics of the location.	418.52 108.21 199.51	1,885[1] 488[2] 899[3]	We recommend commissary and exchange expenditure share estimates that are based on CONUS patterns, or on an explicit policy, rather than actual expenditures.
4.1.4	Exchange rate adjustment system	NA	NA	The new exchange rate threshold of 5% is a reasonable compromise between frequency of exchange rate adjustment and the potential cost to the member. However, we recommend that PDTATAC continue to explore the advantages of continuous (bi-weekly) adjustments for exchange rate changes.
4.1.5	Current program assumes no difference in CONUS and OCONUS prices for items in the 'Miscellaneous' category ▪ Assume ratio of OCONUS to CONUS prices for items in 'Miscellaneous' category reflects ratio of prices for the market basket as a whole.	78.64	354[4]	We recommend that actual prices be collected for the Miscellaneous category. In the interim, we recommend that prices in the Miscellaneous category at OCONUS locations be presumed to bear the same relationship to CONUS prices in that category as the expenditure-weighted average of the prices across the categories that are collected for that location bear. PDTATAC should study the implications of formally pricing the Miscellaneous category prior to a final decision to implement.

Note: Shaded rows indicate policies that may result in a COLA decline for members at some locations.

1 The COLA would actually decline, by an average of $783 per year, for approximately 8,245 members at 7 locations in our model.

2 The COLA would actually decline, by an average of $196 per year, for approximately 8,245 members at 7 locations in our model.

3 The COLA would actually decline, by an average of $846 per year, for approximately 43,252 members at 16 locations in our model.

4 If price data for items in the Miscellaneous category were collected, as recommended, then COLA amounts could decline at a location if OCONUS prices were lower than CONUS prices.

Table 29. Summary of Issues and Findings (continued)

Section in Report	Issue/Scenario Analyzed	Cost/Benefit per Year for Policy/Scenario Analyzed		Recommendations
		Total Cost ($ Millions)	Benefit per Member ($)	
Market Basket Items				
4.1.6.1	Long distance phone calls and trips home are not included in the OCONUS COLA. These expenses typically are covered in the private sector. ▪ Include a trip home, per tour, for member and dependents ▪ Include 30 minutes/month of long-distance phone service	167.20 10.36	753 47	We recommend that (1) members and dependents be funded for one trip to the United States for each three-year OCONUS tour, and (2) the cost of 30 minutes of long distance service per month be included in the OCONUS COLA.
4.1.6.2	Dependents' schooling expenditures may not be fully covered when DoDDS schools are unavailable.	NA	NA	Refer issue to DoDDS.
4.1.6.3	The potential income loss for spouses during an accompanied overseas assignment could be substantial.	NA	NA	The Services should attempt to limit potential spouse losses through a more flexible, voluntary assignment program. In addition, the Services should consider making spouses eligible for the unused portion of the member's Tuition Assistance (TAP) benefit while the member is on an accompanied OCONUS tour, or consider "spouse transition assistance" in the form of one or two months of the member's basic pay. We suggest, however, that the payment be a function of the member's basic pay, to make administration tractable.

Table 29. Summary of Issues and Findings (continued)

| Section in Report | Issue/Scenario Analyzed | Cost/Benefit per Year for Policy/Scenario Analyzed | | Recommendations |
		Total Cost ($ Millions)	Benefit per Member ($)	
		Data Collection		
4.2.1	Outsource collection of OCONUS price data .	NA	NA	We do not recommend that the Services outsource OCONUS data collection at this time. However, we do recommend that they continue to explore the issue.
4.2.2	OCONUS price data are gathered annually, or more frequently at command request. An alternative to out-of-cycle price surveys to update the COLA is to use local prices indices and information.	NA	NA	We recommend that the Services explore the possibility of using local price indices and information to update the OCONUS COLA on an interim basis—especially in countries with historically high rates of inflation.
4.2.3	CONUS prices for many items purchased in the local economy are estimated using data from the commissary and exchange services.	NA	NA	Because CONUS prices affect all OCONUS COLA payments, we recommend that the PDTATAC regularly validate these prices through independent sampling, independent external indices, and other forms of quality assurance.
4.2.4	The Living Pattern Survey is administered tri-annually to estimate government facility/local economy expenditure shares.	NA	NA	If the recommendation is accepted to set expenditure shares by policy, we recommend that the frequency for the administration of the LPS be scaled back. The actual survey results may be used as one piece of information to be considered in setting expenditure shares.
4.2.4	Small sample size when administering the Living Pattern Survey may result in imprecise estimates of commissary/exchange proportions	NA	NA	PDTATAC should produce scientifically based sample selection and administration guidelines for the locations, and should select sample sizes that meet requirements for desired precision of estimates.
4.2.5	Seasonal price fluctuations may result in a cost-of-living indices that over-or-understate the annual average cost of living difference between CONUS and OCONUS locations	NA	NA[5]	PDTATAC should begin to develop methods that would ensure that prices are not biased or suffer from high error rates due to seasonality. (We have suggested several approaches.)

Note: Shaded rows indicate policies that may result in a COLA decline for members at some locations.

5 The COLA could decline (increase) at some locations if the price survey is currently administered in a month when seasonal price fluctuations result in OCONUS prices that are higher (lower) than the country annual average, or if CONUS prices are lower (higher) than the CONUS annual average.

Table 29. Summary of Issues and Findings (continued)

Section in Report	Issue/Scenario Analyzed	Cost/Benefit per Year for Policy/Scenario Analyzed		Recommendations
		Total Cost ($ Millions)	Benefit per Member ($)	
Spendable Income Calculation				
4.3.1	As currently calculated, the spendable income table is not updated frequently and is largely based on a non-military population, which may bias COLA amount ▪ Index 1988-1989 S.I. table to 1999 using the CPI ▪ Implement new (1994-1995) table in FY 2001[6] ▪ Index 1994-1995 S.I. table to 1999 using the CPI[6]	91.52 26.91 54.42	412 121 245	We recommend that the table be updated more frequently and that it be indexed for inflation in years in which it is not updated. We also recommend an alternative method for constructing the spendable income table—e.g., using data at the individual household level and an expanded set of covariates.
Location Specific Compensation (COLA Uniques)				
	The current method of determining whether a particular item should be included in a location's COLA payment as a location-unique expenditure is less systematic than it could be.	NA	NA	We recommend a set of criteria or principles for determining location-unique items.
4.4.1	Pay the Uniformed Services the State Department "Hardship Allowance"	NA	NA	We recommend that the Uniformed Services continue to explore this issue as a means to improve staffing at hard-to-staff locations.
4.4.2.4	PDTATAC has been asked to consider covering car safety kits and winterization kits for members in Alaska, and pet quarantine costs under the OCONUS COLA ▪ Pay costs of car safety and winterization kits ▪ Pay pet quarantine costs	6.51 3.31	383/AK Member 15	We recommend that car safety kit and winterization costs in Alaska be expanded under the COLA as location-unique items. We recommend that pet quarantine be considered for coverage under the PCS move program, not the OCONUS COLA.
Safety Net				
4.5.2	"Safety net" for COLA declines due to price changes ▪ Cost of protecting members from 1% increase in CONUS Prices	41.60	187	We recommend that a COLA "safety net" be established that keeps the COLA payment from declining for members on their current tour when the COLA payment would otherwise decline due to an increase in CONUS prices. Because the current pay system may not be able to track the timing of tours, the safety net should apply to all at the location on an interim basis.

6   Subsequent to conducting this analysis using the 1994-1995 Spendable Income table, PDTATAC announced that in FY 2001 a table based on 1997-1998 data will be used instead of 1994-1995 data as was previously anticipated.

Table 29. Summary of Issues and Findings (continued)

Section in Report	Issue/Scenario Analyzed	Cost/Benefit per Year for Policy/Scenario Analyzed		Recommendations
		Total Cost ($ Millions)	Benefit per Member ($)	
Safety Net (continued)				
4.5.3	"Safety net" for COLA declines due to large and rapid exchange rate changes ▪ Initiate an out-of cycle survey ▪ Freeze downward adjustments at a fixed level (e.g., 30%)	NA NA	NA NA	We recommend that when the dollar appreciates by more than 30% since the last scheduled local price survey, a moratorium should be placed on further reductions in the dollar-denominated COLA payments. This "safety net" will prohibit further declines until the scheduled annual price survey validates the decline in the cost of living. In the interim, the command may request and conduct a price survey. If the survey reveals that local prices have increased, so that even the implied decline in COLA is incorrect, the COLA payment will be restored to the level implied by the price survey. If the survey reveals that the cost of living relative to CONUS has declined by more than that implied by the exchange rate changes, further declines in the COLA payments would not be implemented until the time of the scheduled annual price survey.
Voluntary Assignment System				
6	Voluntary Assignment System	NA	NA	We recommend that the Services attempt to move more strongly in the direction of a purely voluntary assignment system. A key element to such a system will be a solid OCONUS COLA. In addition, however, it should be supplemented, to the extent that budget realities permit, with a system of special pay incentives for difficult to fill OCONUS assignments. These special pay incentives will be set by supply and demand conditions for OCONUS positions. Potential advantages of moving toward such a system include: (1) a better match of the preferences of qualified members with assignments; (2) higher retention rates; (3) reduced turnover and greater productivity within an assignment; and (4) explicit budget costs of filling certain positions that more fully reflect the true economic cost of those positions.

Table 29. Summary of Issues and Findings (continued)

Section in Report	Issue/Scenario Analyzed	Cost/Benefit per Year for Policy/Scenario Analyzed		Recommendations
		Total Cost ($ Millions)	Benefit per Member ($)	
Administrative Issues				
7.1	Lump sum payments under OCONUS COLA	*NA*	*NA*	PDTATAC should consider recommending that legislation be prepared that would permit lump sum COLA payments for certain items. Special consideration should be given to items that are legally required or mandated and for which a lump sum payment is required by the member early in the member's tour.
7.2	Administrative determination of program jurisdiction	*NA*	*NA*	We recommend that a committee be formed to ensure that the issues are formally addressed by the appropriate program. We recommend that the primary members of the committee should be the Compensation Directors for the Office of the Secretary of Defense and the Uniformed Services, and the chairman of the Per Diem committee. The Director of Compensation Policy for the office of the Secretary of Defense (FM&P) should chair the committee.

REFERENCES

Anderson, Jack B., "Compensating Your Overseas Executives." *Compensation and Benefits Review*, July/August 1990, pg. 25-36.

Black, J. S., "Work Role Transitions: A Study of American Expatriate Managers in Japan." *Journal of International Business Studies*, 19, 1988: pg.277-293.

Black, J.S., And Gregersen, H. B., "Expectations, Satisfactions, and Intention to Leave of American Expatriate Managers in Japan." *International Journal of Intercultural Relations*, 14, 1990: pg. 485-506.

Borstoff, Patricia C., et al., "Who'll Go? A Review of Factors Associated With Employee Willingness to Work Overseas." *Human Resources Planning*, v 20 n 3, 1997, pg. 29-40.

Brett, J. M., Stroh, L. K., And Reilly, A. H., "Job Transfers." In C. L. Cooper % U. T. Robertson (eds.), *International Review of Industrial and Organizational Psychology*, Vol. 7, 1992: pg. 323-362. Chichester, England: John Wiley and Sons.

Carey, Brian P, "Why Impatriates Need Special Remuneration Packages." *Journal of European Business*, May/June 1993, pg. 46-49.

Carter, N. J., "Moving Managers Internationally: The Need for Flexibility." *Human Resource Planning*, 12, 1989: 47.

Feldman, D. C. And Thompson, H. B., "Entry Shock, Culture Shock: Socializing the New Breed of Global Managers." *Human Resource Management*, 31, 1992: pg. 345-362.

Fox, Harriot L., "Home is Where the Expenses Rack Up." *European*, February 9, 1998, pg. 55.

General Accounting Office (February 1999). *Military Retirement: Proposed Changes Warrant Careful Analysis*. Testimony of Mark E. Gebicke (Director, Military Operations and Capabilities Issues, National Security and International Affairs Division) before the

Subcommittee on Military Personnel, Committee on Armed Services, House of Representatives.

Kates, Steven M. and Spielman, Cheryl, "Reducing The Cost of Sending Employees Overseas." *Practical Accountant*, February 1995, pg. 50-55.

Mervosh, Edward M. "Managing Expatriate Compensation." *Industry Week*, July 21, 1997, pg. 13-18.

Organization Resources Counselors, Inc. (ORC), "The Career Couple Challenge." *Personnel Journal*, 1995. pg. 1-5

Prince, Michael, "Don't Forget to Bring Your Visa." *Business Insurance*, November 1996. p. 57.

Swaak, Reyer A. "Todays Expatriate Family: Dual Careers and Other Obstacles (Changes in the American family presents challenges to HR executives trying to fill overseas positions)." *Compensation Benefits and Review*, May 1995, pg. 21-26.

Varian, Hal R., *Microeconomic Analysis*, Third Edition, W. W. Norton & Company, Inc. 1992, p.102

APPENDIX A

COMMISSARY PROPORTIONS
REGRESSION ANALYSIS _____

We conducted a preliminary analysis of shopping patterns of OCONUS members to determine what factors increase the propensity of members to shop at the commissary/exchange versus in the local economy. The data allowed us to test three hypotheses:

1. Commissary/exchange shopping proportions are higher, the better is the commissary and exchange;

2. Commissary/exchange proportions are lower for those who must travel to visit the commissary and exchange; and

3. Commissary/exchange proportions are higher, the higher are the prices in the local economy.

To test these hypotheses, we obtained data on the proportion of purchases that members make at the commissary/exchange for each item in the cost-of-living market basket for the largest (in terms of number of members) 64 OCONUS locations. We used the market basket weights to calculate the weighted average proportion of purchases at the commissary/exchange. We calculated two measures of propensity to purchase on base: (1) the weighted average proportion of purchases at the commissary; and (2) the weighted average proportion of purchases on base (i.e., at both the commissary and the exchange).

Next, we obtained data from the Defense Commissary Agency (DECA) on the location of OCONUS commissaries and the number of line items (i.e., distinct products/brands) sold at each commissary. The number of line items is an indication of the selection available at the commissary. Presumably, commissaries with a broader selection of goods are more attractive to members. Thus, one would expect the number of line items to have a positive effect on the proportion of members' spending that occurs on base.

We matched the commissary locations from the DECA list with the 64 OCONUS locations in this analysis. Forty-three of the 64 locations had a commissary at the location, and another 13 locations had access to a commissary at a neighboring installation. (For those 13 locations without a commissary we did not measure the distance to the commissary). For eight locations, we were unable to identify a commissary in the same geographic area.

We did not have data on exchanges. In the empirical analysis, we assume that locations with a commissary are likely to have an exchange. Also, we assume that the quality of the commissary, as measured by number of items stocked, will also be a proxy variable for the quality of the exchange. We conducted our analysis using both measures of government facility/local economy shopping proportions described above—(1) the proportion of spending at the commissary, and (2) the proportion of spending at both the commissary and the exchange. Our results were similar for both analyses which suggests that commissary location and quality are good proxies for exchange location and quality.

We analyzed the effect that the explanatory variables have on the proportion of spending at the commissary/exchange by estimating an Ordinary Least Squares (OLS) regression model. The database constructed for this analysis consisted of 64 observations—each representing a separate OCONUS location. Twenty-three of the locations were in Germany. The Germany locations often have similar values for some of the variables because locations in close proximity to one another are often

grouped for calculating COLA amounts and often share the same commissary. To control for this, we estimated a weighted regression where each of the 23 Germany locations was given a weight of 1/23. The other locations each received a weight of 1.

Two dependent variables were analyzed: (1) the proportion of purchases at the commissary, and (2) the proportion of purchases at the commissary and exchange. Four independent variables are included in the model.

1. **Line Items**. The number of line items at the commissary (in thousands) is included as a continuous variable.

2. **Have Commissary**. An indicator, or "dummy," variable was included that takes on the value of 1 if we were able to identify a commissary in the same geographic region as the 64 OCONUS locations which a cost-of-living index is calculated, and 0 otherwise. For locations without a matched commissary, the variable "Line Items" was set to 0.

3. **Same Location**. A dummy variable was included that takes on the value of 1 if the commissary is located at the location for which a cost-of-living index is calculated and 0 otherwise.

4. **Local Price Index**. An index that shows the price of goods in the local economy relative to CONUS prices.

Summary statistics for the dependent and explanatory variables and the estimates from the regression models are shown in ***Tables A-1 to A-3***. We only report the regression output for the analysis that uses the percentage of purchases at the commissary as the dependent variable. The results were similar when the percentage of purchases at <u>both</u> the commissary and exchange was used as the dependent variable.

Table A-1. Summary Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
Percentage of purchases at commissary	69.97%	18.72	21%	88%
Percentage of purchases at commissary and exchange	63.41%	17.86	18%	80%
Number of Line Items (in thousands) (for 56 locations with this variable)	7.86	2.91	1.35	15
Have Commissary	0.86	0.35	0	1
Same Location	0.66	0.48	0	1
Local Price Index	149.2	20.27	113.72	209.17

Table A-2. Regression Output: Linear Model

Variable	OLS Coefficient	T-Statistic
Intercept	2.11	0.19
Number of Line Items (in thousands) (for 56 locations with this variable)	1.28	1.93*
Have Commissary	18.56	2.37**
Same Location	1.47	0.36
Local Price Index	21.2	3.00**

Statistically significant at the 0.10 level.
**Statistically significant at the 0.05 level.

Table A-3. Regression Output: Log Model

Variable	Elasticities	T-Statistic
Intercept	0.51	0.64
Number of Line Items (in thousands) (for 56 locations with this variable)	0.21	1.94*
Have Commissary	0.26	1.03
Same Location	0.04	0.44
Local Price Index	0.58	2.69**

Statistically significant at the 0.10 level.
**Statistically significant at the 0.05 level.

We present the results for two model specifications. The first is a linear model (**Table A-2**). The second is a log model that is used to calculate the "elasticity" of each variable (**Table A-3**). An elasticity is the percent change in the independent variable that results from a one percent change in the dependent variables.

The two regressions suggest that the proportion of spending on base increases with quality of the commissary (as measured by number of line items), proximity of the commissary, and relative prices in the local economy. The R-squared statistic for the linear model (R-squared=0.54) indicates that 54 percent of the variation in the dependent variable across locations is explained by the four explanatory variables.

Each 1,000 additional line items at the commissary cause the proportion of member's spending on base to increase by 1.28 percentage points (**Table A-2**). In terms of elasticity, a ten percent increase in the

number of line items increases the proportion of spending at the commissary by two percent (***Table A-3***).

Having a commissary in the geographic region increases the proportion of spending at the commissary by nearly 19 percentage points, and having the commissary at the same location where members are stationed increases the proportion of spending at the commissary by an additional 1.47 percentage points—although this later estimate is not statistically different from zero (***Table A-2***). This small effect suggests the possibility that the commissary-location match was imprecise, or that a better measure of commissary proximity is needed.

The coefficient on the variable Local Price Index indicates that each doubling prices in the local economy would increase cause the proportion of members' spending on base to increase by 21.2 percentage points (***Table A-2***). The point elasticity for this variable indicates that a 10 percent increase in prices would lead to a 5.8 percent increase in the proportion of purchases at the commissary (***Table A-3***).

In both regressions, the predicted proportion of spending at the commissary was within two standard deviations of the actual proportion at 59 of the 64 locations modeled. At two locations (Kodiak, Alaska and San Juan, Puerto Rico) the predicted proportion was more than two standard deviations above the actual proportion. At three locations (La Maddalena, Italy; Oahu, Hawaii; and London, England) the predicted proportion was more than two standard deviations below the actual proportion.

APPENDIX B   Estimated Costs To Individual Services Of The Issues Analyzed

Section	Issue/Scenario Analyzed	OCONUS COLA Amount (in millions of dollars)							Change in COLA	
		Army	Navy	USAF	USMC	USCG	NOAA	PH	DoD (in $M)	Per Member (in $)
	Current OCONUS COLA Amounts	$252.32	$182.76	$234.65	$ 77.53	$10.67	$0.036	NA	$757.97	$3,414
		Increase or Decrease in COLA								
	Index Structure									
4.1.2	Use CONUS commissary/exchange proportions	165.18	70.26	142.14	39.37	1.55	0.02	NA	481.52	1885
4.1.22	Use weighted average of 75% OCONUS proportion and 25% CONUS proportion	41.92	17.5	937.97	10.12	0.6	0.01	NA	108.21	487
4.1.23	Use commissary proportions based on a regression model*	38.87	32.66	79.19	30.95	-2.17	0.01	NA	199.51	899
	Market Basket Items									
4.1.44	Presume prices in Miscellaneous category reflect ratio of OCONUS/OCONUS prices in other categories*	26.18	18.96	24.35	8.04	1.11	0.00	NA	78.64	354
4.1.5.1	Fund one plane trip home per tour	55.70	44.09	49.82	15.21	1.97	0.01	0.41	167.20	753
4.1.5.1	Fund 30 min. long distance phone service/month	3.54	2.59	2.89	1.18	0.14	0.00	0.02	10.36	47
	Spendable Income									
4.3.1	Index the 1988-1989 S. I. Table to 1999	30.52	22.42	27.94	9.40	1.23	0.004	NA	91.52	412
4.3.1	Index the 1994-1995 S. I. Table to 1999	9.01	6.53	8.29	2.72	0.36	0.00	NA	26.91	121
4.3.1	Index the 1994-1995 S. I. Table to 2001	19.16	13.69	15.30	5.65	0.62	0.003	NA	54.42	245
	Location-Unique Expenditures									
4.4.2.4	Alaska car safety kit and winterization expenses	2.36	0.003	3.65	0.01	0.37	0.00	0.09	6.51	412 per AK Memberr
4.4.2.4	Pet quarantine costs	NA	NA	NA	NA	NA	NA	NA	3.31	171
	Safety Net Issues									
4.5.3	Implications of Recent Alaska Safety Net	2.64	0.10	5.61	0.03	0.24	0.00	NA	3.15	479
4.5.3	Implications of 1% increase in CONUS prices	15.60	9.48	12.47	3.28	0.77	0.00	NA	41.60	187

*Denotes an open ended estimate (estimate may vary depending on specific service requirements.)

1 The COLA would actually decline, by an average of $783 per year, for approximately 8,245 members at 7 locations in our model.
2 The COLA would actually decline, by an average of $196 per year, for approximately 8,245 members at 7 locations in our model.
3 The COLA would actually decline, by an average of $846 per year, for approximately 43,252 members at 16 locations in our model.
4 If price data for items in the Miscellaneous category were collected, as recommended, then COLA amounts could decline at a location if the OCONUS prices were lower than the CONUS prices.

APPENDIX C

THE OCONUS COLA
POLICY ANALYSIS MODEL _____

Estimates of the cost implications of various alternatives presented in this study were produced using the OCONUS COLA Policy Analysis Model (OCPAM), which was developed as part of this project. OCPAM is a Microsoft Excel based spreadsheet model that allows the user to manipulate several aspects of the OCOLA process and readily determine the impact of changes on the OCOLA budget and on the COLA amounts that individual members will receive. As its name suggests, the purpose of this model is to produce consistent, accurate estimates of the relative effects of changes to the OCOLA system for policy analysis. The estimates are not appropriate for budget projections.

Underlying the model is a set of worksheets with data that emulate the COLA calculation process. The model includes a total of 65 OCONUS locations that cover approximately 95% of the members stationed in OCONUS assignments. These worksheets contain the default (current) values for OCONUS and CONUS prices, market basket weights, spendable income, and the population of members at each covered location. Additionally, there are a number of sheets that calculate COLA indices and COLA amounts under the baseline and alternative schemes. The user can set switches to enable or disable various options and can quickly build scenarios to test different COLA features. Finally, the model provides summary and detailed information on the impact of user-modeled changes to the OCOLA system.

Figure C-1 shows the model's input parameter screen, which allows the user to implement alternatives like the safety net, simulated price changes by category, updated spendable income tables, and different weighting schemes for the index.

The spreadsheet environment means that model modification for extension to new policy questions is simple. Additionally, the summary output is easily exported or reformatted for display in tabular or graphical format.

Figure C-1: OCPAM Input Parameters Screen